IN TWO PARTS • PART TWO

22nd Annual Plant Buildings Supplement

FACTORY
MANAGEMENT AND MAINTENANCE

APRIL 1956

TOP PLANTS OF 1956

SECTION

Award Winners ..... A

Buildings and Grounds ..... B

Electrical Services C

Plant Services ..... D

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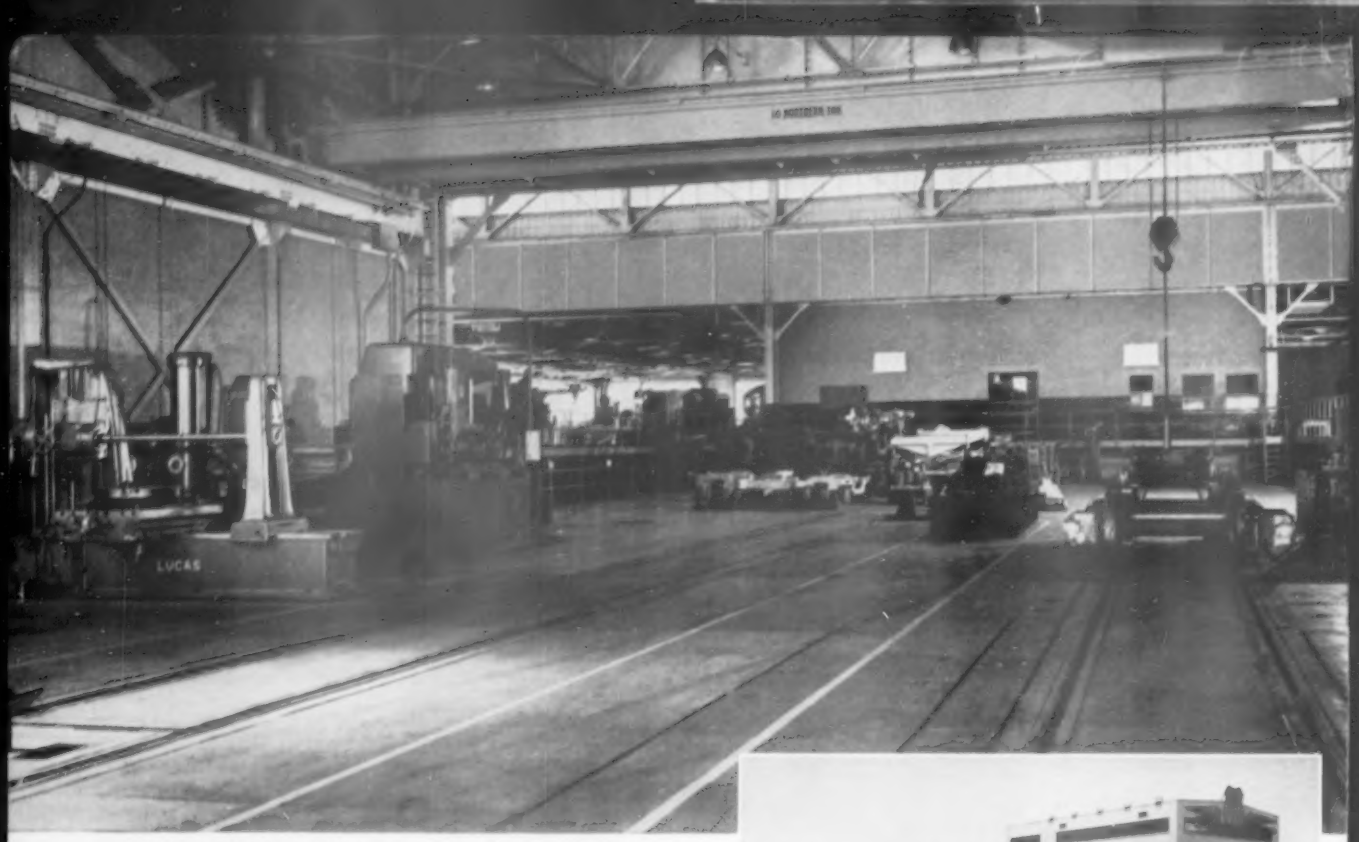


Union Pacific Railroad's new diesel repair and maintenance shop, Salt Lake City, Utah. Constructed by the company's own engineering department under the direction of W. C. Perkins, Omaha, Chief Engineer and R. M. Brown, Salt Lake City, District Engineer. William N. Stockton, Salt Lake City, Resident Engineer in charge of actual construction.

MASTERPLATE "Iron-Clad" Concrete Floors in Union Pacific's new Diesel Shop

Union Pacific Railroad's decision to install a Masterplate surfaced floor in their new Salt Lake City diesel repair shop resulted from their careful study of ways to obtain a floor that would aid in the smooth flow of work, reduce maintenance expense and improve plant safety.

Many million square feet of Masterplate armored floors in service in America's leading plants show that Masterplate floors are 4-6 times more wear-resistant than the best plain concrete floor... are non-dusting, corrosion-resistant, easy-to-clean, non-slip and spark-safe.* Non-colored and colored.

A Masterplate "iron-clad" concrete floor is the lowest cost floor you can install in your new plant. Your badly worn concrete floors can economically be made *better* than new by resurfacing with Masterplate. *Full information on request.*

* Static-disseminating, spark-resistant floors are produced with DPS Masterplate.

Thick armored surface makes MASTERPLATE Floors 4-6 TIMES MORE WEAR RESISTANT than the best plain concrete.

The MASTER BUILDERS Co

Division of American-Marietta Company

FACTORY
MANAGEMENT AND MAINTENANCE

The 1956 Winners

of FACTORY's Significant Plant Awards

Ideas you can use—for upgrading your existing plant, or planning a new one. That's what you'll find by visiting—through the eyes of FACTORY's editors—the top ten plants of 1956. Plus a raft of Special Award winners. Selected by the editors from more than 500 candidates nominated by leading architects and builders, development commissions, and FACTORY's readers.

A

SECTION A

A gallery of paintings of the top ten plants, done in watercolor by Kent Day Coes A-2

Roster of FACTORY's Special Awards A-12

SECTION B—Buildings and Grounds

General Award Winners B-1

Special Award Winners B-18

SECTION C—Electrical Services

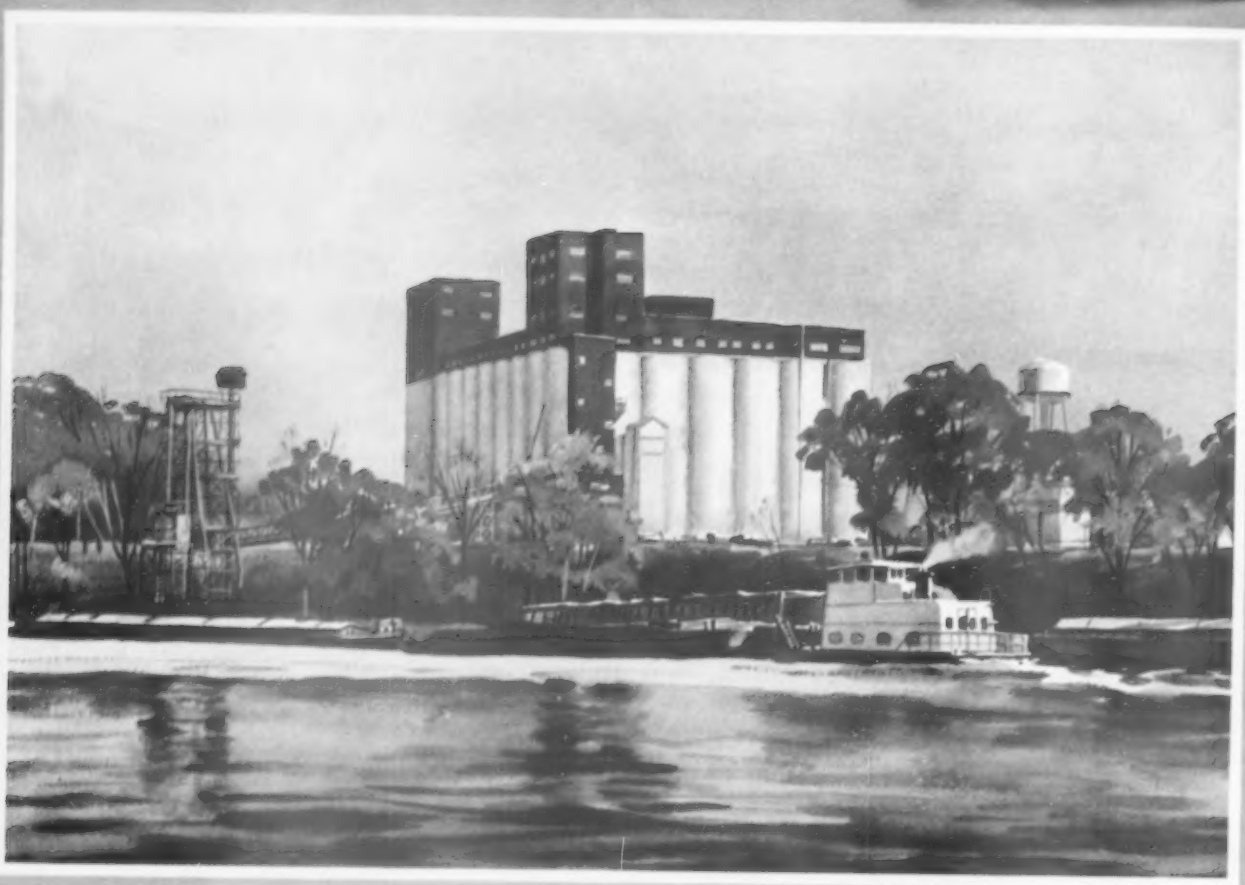
General Award Winners C-1

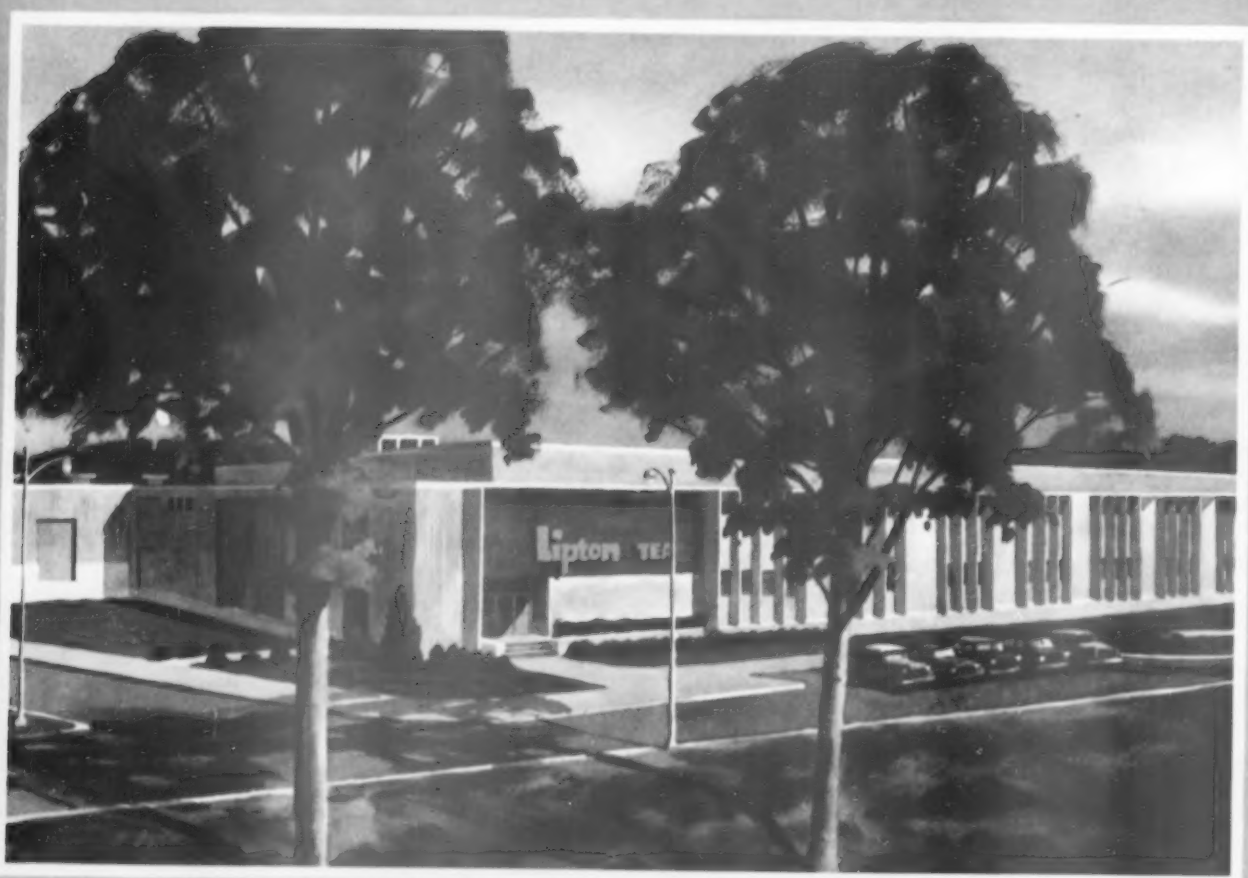
Special Award Winners C-18

SECTION D—Plant Services

General Award Winners D-1

Special Award Winners D-18




Lipton

PLANT OF THE YEAR

Central Soya Company, Inc., and McMillen Feed Mills (FEED MANUFACTURING DIVISION)

CHATTANOOGA

Faced with complex problems of handling, storage, and precision processing for a fast-growing but variable market, Central Soya Company and McMillen Feed Mills built a triple-purpose plant that is ready to meet today's changing needs and tomorrow's demands.

Architects and designers: Technical & Engineering Divisions, Central Soya Company, Fort Wayne, in conjunction with: Macdonald Engineering Co., Chicago, and W. A. Darling & Associates, Fort Wayne
Builders: Macdonald Engineering Co., Chicago; John Martin Co. Inc., General Contractor, Stein Construction Company, Mark K. Wilson Construction Company, T. S. Raulston Company; Chattanooga

Product: Soybean oil and meal, animal and poultry feeds. **Number of employees:** 160 For description see page B-2

A

PLANT OF THE YEAR

Thomas J. Lipton, Inc.

SUFFOLK, VA.

Inside an exterior of bright red, yellow, and aluminum that suggests its packaged product, Thomas J. Lipton designed everything for efficient light manufacturing; made its building adaptable to change, provided plenty of room to grow in; installed every service for production efficiency and employee comfort.

Architect and engineer: R. W. Naef, Architect-Engineers, Jackson, Miss.
Constructors: Stone & Webster Engineering Corp., Boston

Product: Packaged tea and tea bags. **Number of employees:** 200 For description see page B-6

PLANT OF THE YEAR

Rust Craft Publishers

A DIVISION OF UNITED PRINTERS AND PUBLISHERS (INCORPORATED), DEDHAM, MASS.

Long handicapped by big-city operation in widely separated buildings, Rust Craft turned wilderness into garden spot; built a plant that promises low manufacturing costs today, ease of expansion tomorrow; combined traditional architecture with modern plant design that has won the enthusiastic approval of its New England neighbors.

Architect and engineer: Graham, Anderson, Probst & White Inc., Chicago
Builder: Aberthaw Construction Co., Boston

Product: Greeting cards. **Number of employees:** 1500

For description see page B-10

PLANT OF THE YEAR

Sikorsky Aircraft

DIVISION OF UNITED AIRCRAFT CORPORATION, STRATFORD, CONN.

To meet any change in an industry where changes come lightning-fast and the product grows ever bigger, Sikorsky Aircraft sized its new helicopter plant for the future; built it with spacious bays; studded it with plant services uniquely suited to its needs; and equipped it with the best in employee facilities.

Architect and engineer: F. A. Fairbrother and Geo. H. Miehls, Architect & Engineer
Albert Kahn Associated Architects & Engineers, consultants: Detroit
General Contractor: Sikorsky Aircraft

Product: Helicopters. **Number of employees:** 4000

For description see page B-14

OASIS

The Ebco Manufacturing Company

COLUMBUS, OHIO

With only a modest power demand but with enlightened planning, Ebco created a new plant that sets a high mark for efficient electrical distribution, imaginative power utilization, and ample insurance against outage — and is notable for the best in manufacturing services, employee facilities, and handsome design.

Architect: Merle Robert Maffit, Columbus
Engineer and builder: F & Y Building Service, Inc., Columbus
Consulting electrical engineers: Walter E. Metzger & Associates, Columbus

Product: Water coolers and dehumidifiers. **Number of employees:** 267

For description see page C-2

P. Lorillard Company

GREENSBORO, N. C.

With planning that looked far ahead, P. Lorillard Company created a spacious plant that is nine ways better electrically; designed it superbly for current and future processing and manufacturing needs; equipped it generously with top services for both operations and workers; made it eye-pleasing inside and out.

Architect and engineer: Lockwood Greene Engineers Inc., New York City
Builder: H. L. Coble Construction Company, Greensboro
Electrical contractor: Starr Electric Company, Inc., Greensboro

Product: Cigarettes. **Number of employees:** Ultimately 1250

For description see page C-10

A

GE

PARKER-KALON

General Electric Company

GENERAL PURPOSE CONTROL DEPARTMENT, BLOOMINGTON, ILL.

To make a line of products in which change and innovation are the only constants, General Electric built for its General Purpose Control Department a new plant where flexibility and expandability are key features, plant services are adequate for every foreseeable need, and employees work in safe, comfortable surroundings.

Architect and engineer: Vern E. Alden Company, Chicago
Builder: Felmley-Dickerson Company, Bloomington, Ill.

For description see page D-2

Product: General control items—motor starters, pushbuttons, etc. **Number of employees:** 1600

Parker-Kalon Division

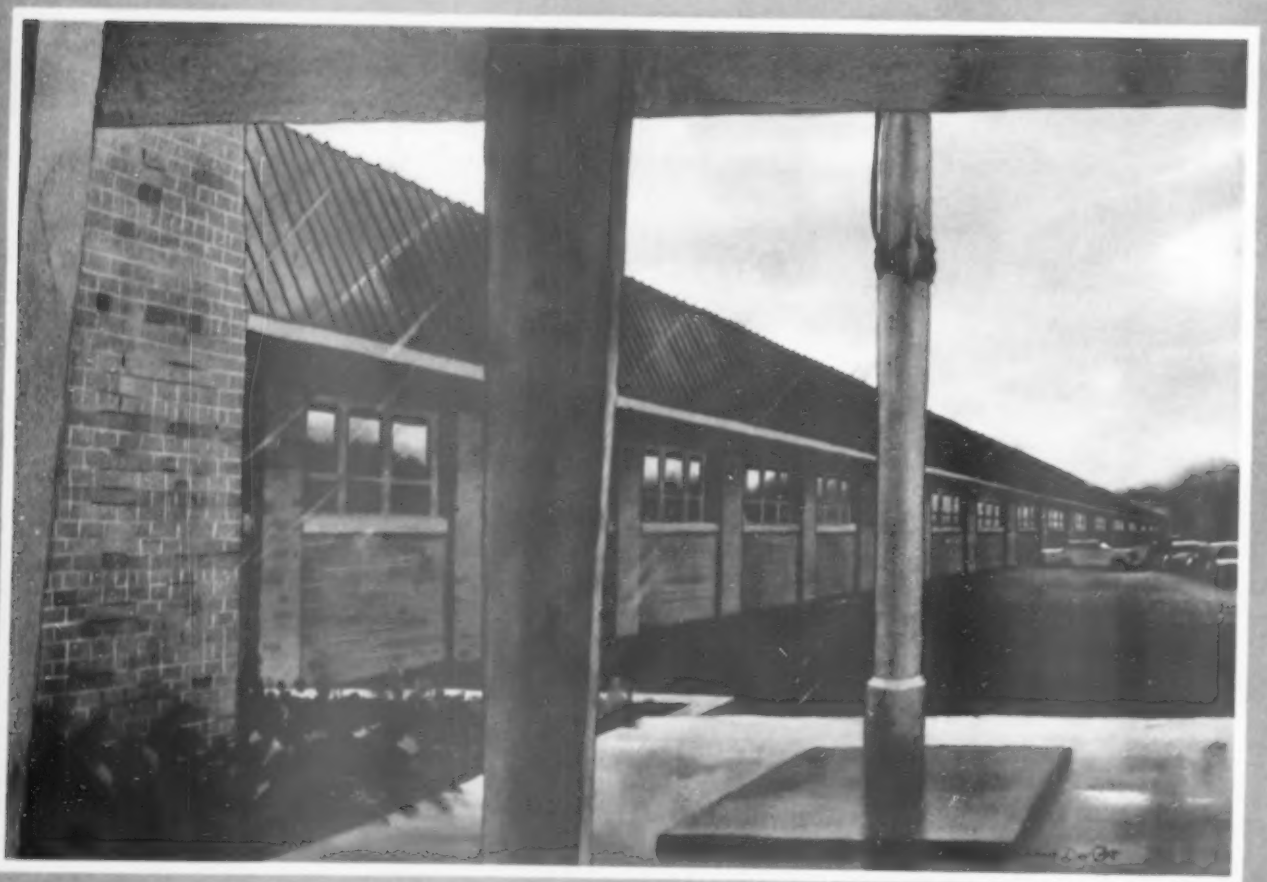
GENERAL AMERICAN TRANSPORTATION CORPORATION, CLIFTON, N. J.

Plans laid long in advance gave Parker-Kalon a sparkling new plant with built-in insurance against growing pains, unsurpassed utilities and services that reach everywhere, construction features that once saved building costs and now speed production, and new highs in plant protection and employee comfort.

Engineers and builders: Walter Kidde Constructors, Inc., New York City and Houston

Product: Fasteners. **Number of employees:** 1000

For description see page D-6



PLANT OF THE YEAR

Sylvania Electric Products Inc.

LIGHTING DIVISION, ST. MARYS, PA.

Among old and friendly neighbors, and with abundant water, fuel and power at hand, Sylvania created a split-level plant that makes best use of the lay of the land, designed it to wring savings from production and materials handling, endowed it with built-in plant-service networks that meet unusual needs.

Architect and engineer: Facilities Planning Office, Sylvania Electric Products Inc., Williamsport, Pa.
Paul H. Von Wert, AIA, Architect
General Contractor: Hughes-Foulkrod Company, General Contractors, Philadelphia

Product: Incandescent and telephone-switchboard lamps. **Number of employees:** 340 For description see page D-10

PLANT OF THE YEAR

Briggs & Stratton Corp.

WAUWATOSA, WIS.

Urgently in need of additional capacity for its thriving business, Briggs & Stratton looked to the future, built a new plant that is a model for new-plant planners everywhere; equipped it for still more growth; planned it to meet fast-changing production needs; set it apart from others by its unexcelled services.

Architect and engineer: F. A. Fairbrother and Geo. H. Miehls, Architect & Engineer
Albert Kahn Associated Architects & Engineers, consultants; Detroit
Builder: Hunzinger Construction Co., Milwaukee

Product: Single-cylinder 4-cycle air-cooled gasoline engines. **Number of employees:** 1500 For description see page D-14

Special Award Winners

Hunter Engineering Co., Riverside, Calif. **B-18**
Architect and engineer: Pereira & Luckman, Los Angeles. Builder: Hoefer Construction Company, Fontana, Calif. Product: Research and development. Employees: 250

ElectroData Corporation, Pasadena, Calif. **B-18 & B-20**
Architect and engineer: Claud Beelman & Associates Architects & Engineers, Los Angeles. Builder: Gavin-Hardy Inc., Los Angeles. Products: Electronic data processing machines. Employees: 300

Taylor Instrument Companies, San Leandro, Calif. **B-19**
Architect: Anshen & Allen, San Francisco. Structural engineer: Robert D. Dewell, San Francisco. Builder: Swinerton & Walberg Co., Oakland, Calif. Products: Temperature control instruments. Employees: 35

Continental Division, Ford Motor Company
Ecorse Township, Mich. **B-19**
Architect: Giffels & Vallet, Inc., L. Rossetti, Associated Engineers and Architects, Detroit. Builder: The H. K. Ferguson Co., Cleveland. Product: Automobiles. Employees: 600

Servomechanisms, Inc., Western Division
Hawthorne, Calif. **B-19**
Architect and engineer: Larsen Associates, Van Nuys, Calif. Builder: Oltmans Construction Company, Monterey Park, Calif. Product: Electronic and electromechanical components, products, and systems. Employees: 407

Garden State Mower Company
Division of U. S. Hammered Piston Ring Co., Inc.
New Providence, N. J. **B-20 & C-20**
Architect and engineer: Engineers Company Inc., Newark, N. J. Builder: Wm. L. Blanchard Co., Newark. Product: Lawn mowers and garden implements. Employees: 114

Brown & Grist, Inc., Warwick, Va. **B-20**
Architect, engineer, and builder: Brown & Grist, Inc. (owners). Product: Aluminum awning windows and panel units. Employees: 127

National Homes Corporation, Tyler, Tex. **B-21**
Architect: National Homes Corporation, Architectural Department. Engineer: Lawrence F. Peeler & Associates, Dallas. Builders: Peterson Construction Co. and L. H. Lacy Company, Dallas. Product: Prefabricated homes. Employees: 300

California Spring Co. Inc., Los Angeles **B-21**
Architect, engineer, and builder: John A. Alexander Co. Inc., Huntington Park, Calif. Coordinators: M. W. Blackstone, California Spring Co. Inc.; and Lesser Industrial Properties, Ltd. for Slauson Industrial Center, Beverly Hills, Calif. Products: Mechanical coil springs, wire forms, metal stampings, small assemblies. Employes: 170

The Daven Company, Livingston, N. J. **B-21 & D-20**
Architect and engineer: Engineers Company Inc., Newark, N. J. Builder: Wm. L. Blanchard Co., Newark. Product: Electrical and electronic equipment and components. Employees: 250

Western Electric Company, Inc., Radio Division
Winston-Salem, N. C. **B-22 & D-19**
Engineer: Walter Kidde Constructors Inc., New York City and Houston, Texas. Engineers and builder: Western Electric Company, Inc. (the owners). Product: Communication devices. Employees: 4000

Hightstown Rug Company, Hightstown, N. J. **B-22**
Architect: James C. Flaherty, A.I.A., Dedham, Mass. Engineer: Hightstown Rug Company Engineering Department. Builder: Lewis C. Bowers & Sons, Princeton, N. J. Product: Velvet carpet. Employees: 100

The Bridgeport Hardware Manufacturing Corporation, Bridgeport, Conn. **B-22**
Architect: Herbert C. Elton, Consulting Architect, Bridgeport. Engineer: Alexander D. Crosett & Associates, New York City. Builder: Edwin Moss & Son, Inc., Bridgeport. Product: Machinists' hand tools. Employees: 150

Central Soya Company, Inc., and McMillen Feed Mills (Feed Manufacturing Division)
Chattanooga **C-18**
A general award winner. For data, see page A-3.

Townsend Company, Ellwood City, Pa. **C-18**
Architect: Joseph F. Bontempo, Rochester, Pa. Engineer: Michael Baker Jr., Inc., Rochester, Pa. Builder: Mellon-Stuart Co., Pittsburgh, Pa. Product: Secondary operations. Employees: 200

Silicones Division
Union Carbide and Carbon Corporation
Long Reach, W. Va. **C-19, D-21, & D-22**
Engineer: Day & Zimmermann Inc., Philadelphia. Builder: Baker & Coombs Inc., Morgantown, W. Va. Product: Silicones. Employees: 350

General Electric Company
Specialty Control Department
Waynesboro, Va. **C-20 & D-19**
Architect and engineer: Whitman Requardt and Associates, Baltimore. Builder: J. A. Jones Construction Company, Charlotte, N. C. Product: Aircraft and industrial controls. Employees: 700

General Electric Company
General Purpose Control Department
Bloomington, Ill. **C-21**
A general award winner. For data, see page A-9

Shell Oil Company, Anacortes, Wash. **C-22 & D-18**
Architect, engineer, and builder: Bechtel Corporation, San Francisco. Products: Petroleum derivatives. Employees: 600

Mead Johnson & Company
South Plainfield, N. J. **D-20**
Designer, engineer, and builder: The Austin Company, Roselle, N. J. Products: Distribution only. Employees: 19

General Electric Company
Industry Control Department, Roanoke, Va. **D-21**
Architect and engineer: J. E. Sirrine Company, Greenville, S. C. Builders: Walsh Construction Company and Wm. Muirhead Construction Co., Salem, Va. Product: Controls. Employees: 2000

The Trane Company, LaCrosse, Wis. **D-21**
Architect: Schubert, Sorensen & Assoc., Inc., LaCrosse. Engineer: The Trane Company engineers. Builder: Peter Nelson & Sons Inc., LaCrosse. Product: Coils. Employees: 238

Schick Incorporated, Lancaster, Pa. **D-22**
Designer, engineer, and builder: The Austin Company, Roselle, N. J. Product: Electric shavers. Employees: 900

SECTION B

Buildings and Grounds

GENERAL AWARD WINNERS

Central Soya Company, Inc., and McMillen Feed Mills
(Feed Manufacturing Division)
"Three Plants in One" . . . . . B- 2

Thomas J. Lipton, Inc.
"Good Looker—and Ready to Grow" . . . . B- 6

Rust Craft Publishers
Division of United Printers and Publishers (Inc.)
"Colonial Outside — 1965 Inside" B-10

Sikorsky Aircraft
Division of United Aircraft Corporation
"Plant for a Fast-Changing Industry" B-14

SPECIAL AWARD WINNERS

Hunter Engineering Co. B-18

ElectroData Corporation . . . . . B-18 & B-20

Taylor Instrument Companies B-19

Continental Division, Ford Motor Company . . . B-19

Servomechanisms, Inc., Western Division B-19

Garden State Mower Company
Division of U. S. Hammered Piston Ring Co., Inc. B-20

Brown & Grist, Inc. B-20

National Homes Corporation B-21

California Spring Co. Inc. B-21

The Daven Company B-21

Western Electric Company, Inc., *Radio Division* . B-22

Hightstown Rug Company B-22

The Bridgeport Hardware Manufacturing Corporation B-22

Catalog News B-30

B

Built around a process Silos, feed mill, and soybean-oil extraction plant add up to a complex but beautifully integrated plant that's a pace-setter for any continuous bulk-flow operation. Shipments arrive and leave by water, rail, highway truck. River provides low-cost barge transportation.

Three Plants in One

DREAMED OF THAT WAY from the start. Built that way all at once. That's what you see a few miles up the Tennessee River from Chattanooga: the (1) mammoth new grain-handling elevators, (2) feed mill, (3) soybean solvent extraction plant of Central Soya Company, Inc., and McMillen Feed Mills.

It's a complex of structures, each tailored to its own purposes, all integrated and made flexible to meet storage and processing needs that change from day to day. And—unusual in what most engineers would call a "continuous-process" plant—it's expandable, ready for every foreseeable need.

CENTRAL SOYA COMPANY, INC., AND McMILLEN FEED MILLS (FEED MANUFACTURING DIVISION), CHATTANOOGA, TENN.

FOR CITATION AND EXTERIOR VIEW OF PLANT, SEE PAGES A-2 AND A-3

Built for multiple operations—McMillen's new plant is designed to:

. . . *Receive* (by river, rail, or highway) feed ingredients from local farmers.

. . . *Cash in* on low-cost transport over a far-flung inland waterway that stretches into the grain lands of the Midwest and the Mississippi Valley.

. . . *Extract oil* from soybeans, use solid residue as a feed ingredient.

. . . *Merchandise* clean, whole grain from silos to local stock- or poultrymen or other feed-makers.

. . . *Manufacture* feeds to prescription formulas.

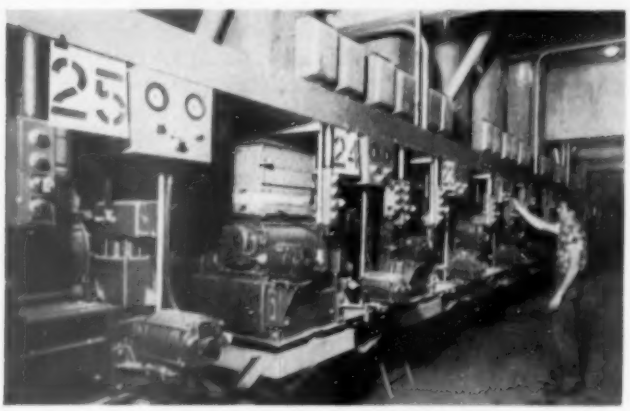
. . . *Ship* grains and feeds by truck, barge, or rail —in bulk, or in paper or textile bags.

Built for tomorrow—McMillen kept its eye on the future. Here's how:

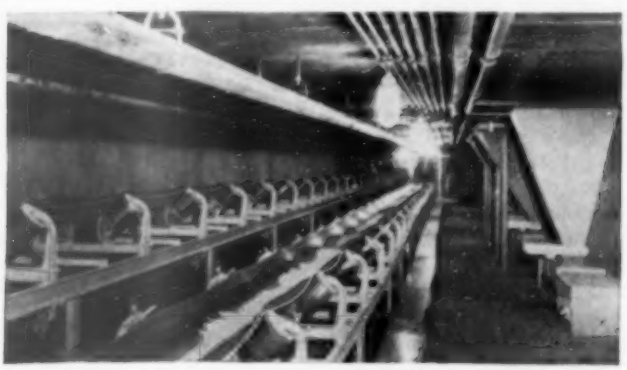
. . . *Tunnels* already beneath future silo and tank areas for materials handling and service lines.

. . . *Warehouse roof* stressed so that floors can be added on top for more machinery.

...from roof Gallery atop elevators and feed mill houses conveyor belts that distribute various grains into silos and ingredient bins.



...to basement Under the bins are these automatic feeders that meter-weigh ingredients onto feed-mixing belt in sub-basement.



...to tunnel Tailor-made for heavy traffic in whole beans, bean meal, water, steam, air, power. Tunnels now unused anticipate expansion.

... *Unused capacity* (60% now used) in the key oil-extraction unit. Power, steam, and building space are already sized for full output.

... *Rail-spotting space* for eight more cars.

Built for handling—Grain handling, feed mixing, and oil extraction add up to a complex operation. But not for McMillen. The plant was built for handling—honeycombed with chutes for gravity flow, built up with towers for elevating grains, tunneled beneath for horizontal flow from building to building and from one processing step to the next. Here's a count of handling facilities the plant was designed for:

... *Belt conveyors.* In the elevators, 12, totaling half a mile; feed mill, 22, totaling a mile; warehouse, 1.

... *Bucket elevators.* Feed mill, 10; elevators, 5; extraction plant, 2.

... *Drag conveyors.* Extraction plant, 7.

... *Pneumatic conveyors.* Extraction plant, 2; feed mill, 1.

... *Screw conveyors.* Extraction plant, 6; mill, 16.

BUILDINGS TAILOR-MADE TO PROCESSES

Biggest structure—The massive, U-shaped elevator group, towering 110 feet. It's made up of 38 concrete silos, plus smaller interstices also used for storage. Total capacity: 2½-million bushels of soybeans, yellow corn, white corn, and other feed ingredients. Plus room for another million bushels within the "U."

Next biggest—The 1200-ton (per 24-hour day) feed mill, built across the open end of the U-shaped elevator group. It's 200 feet long, 40 feet wide, high as the silos. Like the silos, it's built of poured concrete. It's honeycombed with 128 upper-level bins that hold feed ingredients, drop them by gravity over sensitive measuring devices to make prescription-perfect feeds.

Smaller major structures—An enclosed building where soybeans are prepared for oil extraction. And an open building where the oil is extracted, solvent is recovered, and spent residue (high in protein) is prepared as a feed ingredient.

Besides major structures, the plant includes:

... *A barge-unloading facility* at the river's edge, nearly 400 feet from the automatic weighing hopper at the base of the silos. It includes 10 moorings stretching 1100 feet; an 8-story steel framework (deeply bedded in concrete) with a 14,000-bushel-per-hour bucket elevator; a 50-ton conveyor boom, hinged at the land end (to accommodate height of river and depth of cargo); and a 400-ft. sheltered belt that carries grain to the silos.

... *A warehouse and office building* attached to and stretching out from the feed mill.

... *Two steel tanks* for finished soybean oil.

... *Three tanks* for the liquid ingredients.

... *A single-story maintenance and machine shop.*

... *A power house,* with gas-fired package boiler, air compressors, and an inert gas generator.

Turn the page

B

Begins on page B-2

"Meets processing needs that change daily..."

NO BULGE. Concrete buttresses brace inner wall of feed mill against outward pressure of grain bulk-stored in million-bushel storage area enclosed by silos.

Construction—Silos and feed mill were built by slip-forming poured concrete—a non-stop, round-the-clock operation with hydraulic jacks raising forms 9 inches per hour. The 128-bin honeycomb in the feed mill gave engineers one of the most complex slip-form jobs ever set up. More than 8500 cubic yards of concrete and 600 tons of reinforcing steel went into the feed mill; nearly 5000 cubic yards into the silos.

Silos are covered with a prefabricated steel-truss roof. It protects rooftop conveyors and spouts that load grain into silos. And keeps weather out of the million-bushel bulk-storage area within the "U" formed by the silos.

On the corner of the roof nearest the river is a 75-ft. steel headhouse, in which incoming grains are cleaned and from which they are distributed to silos by belts and cradles. A drying unit at the base of the headhouse can handle 2000 bushels of grain per hour. Similar steel towers at each end of the feed mill house elevating equipment that lifts feed ingredients from basement tunnels to top of mill.

Sheathing for the roof gallery and the three towers is Galbestos—galvanized steel plus a bonded coating of asbestos impregnated with a tar resin. It needs no maintenance.

Concrete tunnels beneath silos and feed mill house conveyor and interchanges for ingredients moving from storage to elevating towers, as well as steam, air, water, and other service lines. Through another concrete tunnel—between silos and extraction plant—run service lines and belts that carry soybeans to the extraction plant and return spent solids to the feed mill.

The feed-mill basement was specially constructed to house a line of 35 Wallace & Tiernan Merchen Feeders. These deliver feed ingredients in accurate proportions from hopper chutes to a belt collecting line. The upstairs superstructure houses three Askania systems for micrometric addition of liquid ingredients to the feed mixture.

The extraction process is housed in two units—a three-story milling and conditioning building and an open-structure, four-level extraction building.

Milling building—Construction is steel and concrete slab. Sheathing is aluminum siding alternating with 4-ft. Resolite strips (ice-blue, translucent, corrugated plastic) that provide natural light without glare. No broken window panes, either. Horizontal 6-in. aluminum strips painted "stratosphere blue" bond sheathing to concrete framework, add color interest.

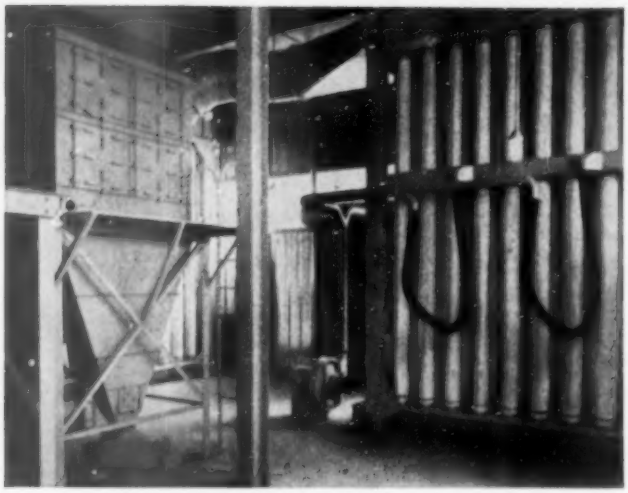
In the concrete-lined basement, soybeans are received for conditioning and dispatched to the open-air extraction unit some 50 feet distant.

Extraction plant—Year-round mild weather permits open construction for the extraction plant (the solvent, hexane, is explosive). One exception: a forced-ventilation, pressurized control room that houses the master graphic control panel.

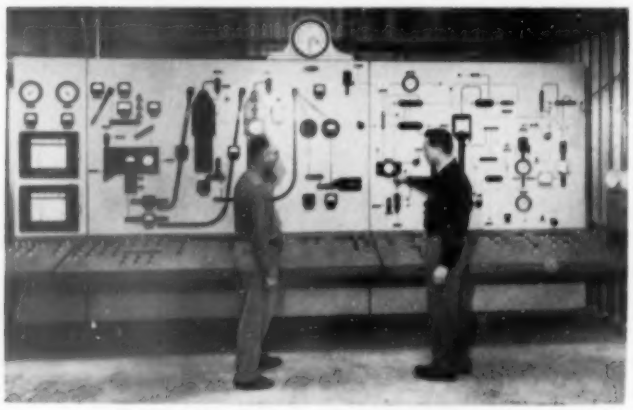
The building stands on steel columns laid out to accommodate the 26-ft.-diam. Rotocel extractor towers for distilling, condensing, stripping, and recovering oil and solvent; a toasting and steaming tower for desolventizing and enhancing protein value of spent flakes; a 75-ton refrigeration compressor; and pumps and feed lines.

Floors (at 13-ft. intervals) are of steel grating, edged with corrugated aluminum and "stratosphere blue" aluminum strips that match those on the milling unit. Concrete slabs, 4½ x 12 feet and tapered to the outside from 4½ to 2 inches, are cantilevered out from the steel framework at every level and at the roof and are bonded by steel strip and mastic. They protect equipment and workers from sun and rain and, in addition, form an outside walkway at the upper levels.

So compact, so automatic is this two-building extraction plant that it requires only three workers and a foreman per shift.



NO DUST. Batteries of cyclones and stocking collectors recover grain dust at all transfer points throughout plant. Recovered dust is returned to process.



NO HANDS. Graphic automatic control panel enables one man to run the whole complex open-air extraction unit. Gas detectors sample gas continuously at four points.

PLANT SERVICES GEARED TO PROCESSES AND SAFETY

Lots of air—Grain dust is wasteful, dangerous. McMillen controls it with air. Hoffman vacuum systems are installed in all major departments for safety and housekeeping. And for economic dust recovery there are 21 air systems at transfer points: silos, 8 systems totaling 50,000 cfm.; feed mill, 9 totaling 50,000 cfm.; milling and extraction plant, 3 totaling 38,000 cfm.

Air for instrument and general service is compressed in two water-cooled 40-hp. compressors (153 cfm. each), distributed at 85 psig. through the tunnel. Instrument air is treated in two silica-gel dryers (38 cfm. each), dispatched to the extraction plant, where instruments are pneumatic. Service air is for clutches, pistons, automatic bagging scales, hoists, automatic slides, etc.

Heat and steam—From a 40,000-lb.-per-hour boiler. Insulated steam pipes pass through tunnels to points of use. Smaller service lines reach out to maintenance shop, warehouse, and offices.

Water—Passes underground to points of use. There's a 150,000-gal. elevated steel tank so built that the top 50,000 gallons may be drawn off for emergency process needs, leaving 100,000 gallons to supply automatic sprinkler systems everywhere. Another 300,000 gallons is stored in a ground-level steel tank, pumped to sprinklers by a 1000-gpm. automatic-start fire pump. A forced-draft cooling tower in the extraction plant keeps make-up water use down to some 5% of cooling-water flow.

Receiving and shipping—Rail space for seven cars, for pneumatic loading or gravity unloading; a 9-truck warehouse dock with roll-up steel doors; conveyors and chutes for loading and unloading open, van, or hopper trucks; rail space for cars bringing liquid ingredients and carrying oil away.

Maintenance—The shop is built and equipped for any repair and for many equipment-making jobs. Upkeep is no problem. Vacuum cleaning in all departments insures cleanliness. Siding in the extraction plant can be brushed down easily.

Communications—A $25,000 Executone system reaches all departments.

Safety, too—No precaution overlooked. Already mentioned: dust collectors, sprinkler systems, Galbestos sheathing, open construction of the extraction plant, intercommunication system.

Also, in the elevators and the feed mill:

. . . *Thermocouples*—Twenty-two of them strung at 5-ft. intervals in every silo to show temperature of stored grain.

. . . *Concrete buttresses*, 10 feet long, 2 feet wide, 40 feet high, built against the inner wall of the feed mill to support pressure of grain stored in the closed "U" made by silos and the feed mill.

. . . *Chutes* for dropping grain into the bulk storage space, keep it from piling too high.

And in the extraction plant:

. . . *Underground emergency storage* of hexane.

. . . *Explosion-proof motors and switchgear.*

. . . *Gas detectors* and continuous sampling. They sound a warning if an explosive concentration of vaporized hexane is discovered.

. . . *Inert gas* (made in the power house by complete combustion of natural gas) in ready supply for purging solvent tanks and extraction units.

. . . *Interlocked equipment* and controls.

Power to spare—Two 3-phase, 1500-kva. outdoor transformers—one on the south side serving the extraction plant, maintenance shop, boiler house, and emergency fire water pump; the other on the north side serving the silos, feed mill, barge landing, warehouse, and office—divide the load.

Incoming power is at 12,000 volts through three underground cables (No. 2, Type H, 15 kva.) serving each transformer. Power at 440 volts is distributed by a distribution panel (with fifteen 225-amp. primary breakers) through underground lines to point of use. Load on the south-side transformer is 1000 kva.; on the north-side unit, 800 kva. Capacitors keep power factor high, tide extraction equipment over momentary power interruptions.

B

THOMAS J. LIPTON, INC., SUFFOLK, VA.

FOR CITATION AND EXTERIOR VIEW
OF PLANT, SEE PAGES A-2 AND A-3

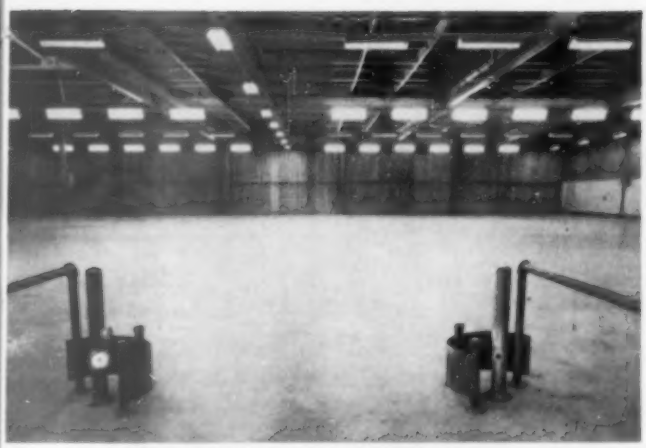
SIMPLE AND EFFICIENT. That sums up the building plan and layout. Notice that employee facilities are close to production area, yet out of way of layout changes.

Good Looker—and Ready to Grow

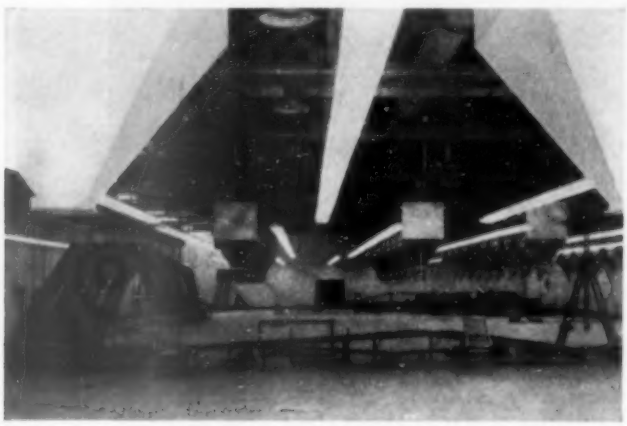
HANDSOME. Exterior of plant is gleaming and colorful, set off by beautiful landscaping.

EVEN MORE IMPRESSIVE than the gleaming red, yellow, and aluminum exterior of the new Suffolk (Va.) plant for Thomas J. Lipton, Inc., are the planning and execution of its "working end." Not only does the exterior look mighty inviting to drivers passing by on heavily traveled U. S. 58 (and particularly, it is hoped, to tea-buying housewives), but the plant as a whole looks equally good to an engineer. It has just about everything that a plant operating man in light manufacturing could ever hope to have in a plant.

It's super-flexible—Key to flexibility lies in big spans. As you can see on the layout diagram above and in the lower photo, facing page, taken during



EXPANDABLE. This photo of the buffer warehouse, taken in the doorway from production area, shows the vast area that can be taken over if more production space is needed.



FLEXIBLE. This photo, taken before most equipment was installed, shows that there are no columns to block layout changes in entire 100x275-ft. production area.

construction, the production area—100x275 feet—is entirely free of columns or other obstructions. However, since the 100-ft. spans are on 25-ft. centers, they provide plenty of structural strength for mounting any future arrangement of overhead tea hoppers, conveyors, or service equipment that may be required, without reinforcement or floor-mounted supports.

In addition, all heating, air-conditioning, and plumbing facilities, and most of the electrical distribution system are located in the trusswork, where they are out of the way of production layout changes and easy to maintain.

Other features guaranteeing flexibility:

. . . *Electric power* is supplied in a grid network throughout the production area. In the trusswork, cables run in a grid on 25-ft. centers, and there are underfloor raceways on 8-ft. centers. Thus, for any possible layout of either floor- or truss-mounted equipment, electric power is available literally within a few feet.

. . . *All permanent installations* such as employee facilities, offices, air-conditioning and heating equipment, electrical substation, and the like are located against outside walls. Here they are out of the way of any planned expansion, and will not interfere with any production layout changes.

Ready for plenty of expansion—Two degrees of expansion were planned for in designing the plant. Key to quick, easy expandability is the buffer warehouse (photo at left). This area was designed so that any time—and on short notice—it could be transformed into a production area. Removal of the panel-construction curtain wall that now separates it from the production area will add a 125-ft. extension.

Like the present production area, it has 100-ft. trusses. Thus, when the wall is removed, Lipton will have a 100x400-ft. column-free production area. As in the existing production area, the trusses are sufficiently oversize to support any reasonable load of truss-mounted production equipment and utilities, and there are empty underfloor raceways—on 8-ft. centers—in which cable can quickly be laid to supply power to future machine installations.

In case still further expansion is required, the building itself is readily expandable. The exterior walls on all but the front of the building are of prefabricated panels—a sandwich of aluminum outside, glass-fiber insulation, and steel inside. These panels are easily removed and reused.

All of the plant's utilities are installed with ease of expansion in mind. For example:

. . . *Power requirements can be tripled* without any interruption to production or any new construction. Because the plant is not a large power user, and in order to hold down initial expense, expandability is achieved primarily by reserving space for future equipment, rather than by installing excess capacity. The transformer vault is, however, large enough to hold transformers and associated switchgear for three times present capacity. And the dual underground cables supplying power to the plant—which would be difficult to increase later—are sized to handle the maximum future capacity of the vault.

. . . *Excess boiler capacity* has been installed. Either of the two boilers is large enough to carry the present load by itself, providing at present 100% standby. Both boilers together will be able to carry any foreseeable expansion.

. . . *Compressor capacity* for cooling the water needed for air conditioning is only slightly over current needs. But there's plenty of room in the equipment room for additional compressors.

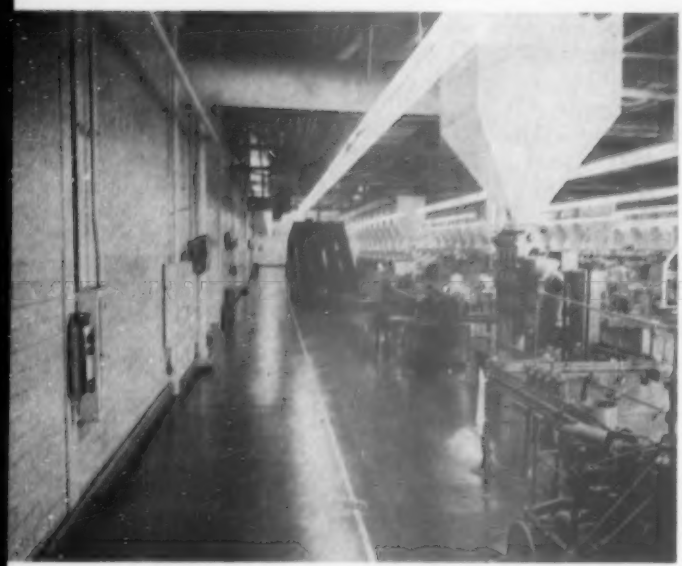
. . . *The common supply and return lines* that supply hot or chilled water to the air-handling units in the shop, and the hot-air return ducts, are now sized for maximum foreseeable load. Lines extending into future additions would merely be tapped into the existing runs.

. . . *Accessory equipment* in the boiler room and air-conditioning room—such as condenser-water and circulating-water pumps—is in duplicate, providing at present 100% standby, plenty of capacity for future needs.

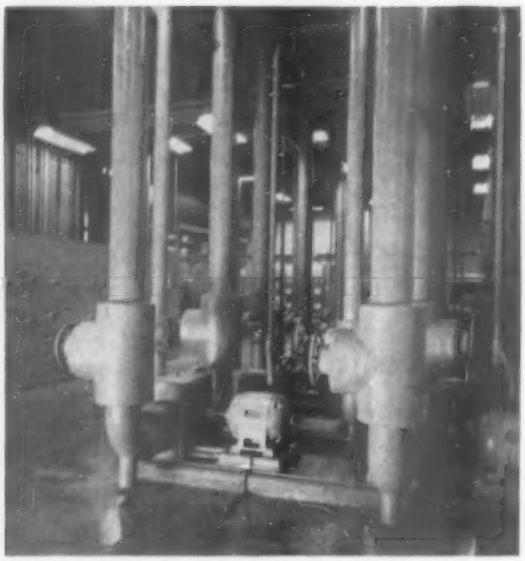
Turn the page

Begins on page B-6

"Appearance, easy maintenance go hand in hand..."



EASY MAINTENANCE. Asphalt-tile floor and ceramic tile on walls makes production-area cleaning easy. Sparkling appearance belies fact plant is in full production.



PLENTY OF SERVICES. Plant now has 1½ times needed power capacity, room to install more. Either of two installed boilers can carry entire plant load.

Almost all of the features that make for the handsome appearance of the plant, both inside and out, are not expensive extras, but cost-saving aids to easier maintenance.

Here are four case examples:

. . . *Ceramic-glazed tile* is used on the lower seven feet of the walls in the production area (see photo above). This not only adds immeasurably to the appearance, but also makes the walls easy to keep clean. And ceramic tile has been used extensively in all locker rooms and washroom areas.

. . . *The floor* in the production area is asphalt tile. Again handsome, but—more important—easy to keep clean. (The concrete floor in the warehouse, where mobile handling equipment is used extensively, has a heavy-duty topping.)

. . . *All corridors* where traffic is heavy have a vinyl-film wainscot. It has an attractive fabric-like surface that can be wiped clean, is completely scuff- and scratch-resistant.

. . . *The plant exterior* is virtually maintenance-free. You'll recall that the walls are of sandwich-panel construction, aluminum on the outside. And all windows and window sills are aluminum. Even the trim on the front of the plant was planned for easy maintenance.

The vertical yellow louvers on the front are of porcelainized steel, and the red porcelain-enamel panels over the entrances can be cleaned—if it's ever necessary—with a damp rag. The louvers, incidentally, are largely for decorative purposes, although they do serve the useful purpose of keeping the worst of the sun's rays outside. Red and yellow were chosen in a not-at-all-subtle attempt to impress upon passers-by that this is where the red-and-yellow boxes of Lipton's tea are packaged and stored for shipping.

PLANT SERVICES TOP-NOTCH THROUGHOUT

The two boilers are of the dual-fuel type. If gas service is interrupted, a switchover to oil service can be made without interrupting production. No process steam is required, so heating and air conditioning (for both the offices and production area) is obtained from hot and chilled water supplied to air-handling units. (Hot water is of course supplied by the boilers; chilled water by two 111-ton centrifugal compressors.)

There are two interesting ways in which Lipton engineers attempted to minimize the load on the air-conditioning system. First, all doors between the air-conditioned areas and the non-air-conditioned warehouse are electric-eye operated, minimizing the spillage of conditioned air (and, at the same time, speeding materials handling). Second, the roof is made up of an insulating glass-fiber formboard, over which a gypsum deck was poured. Furthermore, white marble chips were used instead of slag on the built-up roofing, to reflect a good portion of the sun's radiant heat.

Heat control automatic—Heating economy is provided by a fully automatic system for raising or

PLENTY OF STORAGE. Huge warehouse has 25x50-ft. bays. Interesting lighting idea: Some fixtures are hung at angle with floor to direct light at case labels.

lowering the hot-water temperature in reverse proportion to outside temperature. Pneumatic valves, actuated by an outdoor thermostat, proportion the flow of water through the hot-water boiler to establish the correct mixing temperatures with return circulating water.

In the warehouse area, which is not air conditioned, heat is supplied by unit heaters, again thermostatically controlled. To avoid a build-up of heat in warm weather, roof ventilators provide a complete air change every 10 minutes.

Fire protection—The plant is completely sprinklered and has a water-flow alarm that automatically summons municipal fire trucks in the event of a fire. Since the plant is single-story, has over 4 acres under one roof, and has a minimum of interior walls that would serve as fire walls, smoke-relief vents have been spotted on the roof to prevent the build-up of smoke and heat if a fire broke out. One 16-sq.ft. vent is provided for every 13,000 square feet of roof area—a ratio of 1:120, considered good for this type of plant.

In addition, the major fire hazard—the wooden chests in which the tea is delivered to the plant—are conveyed away from the production line just as soon as they are emptied, and fed to an incinerator (see layout diagram, page B-6).

Electrical system—Simple but good. The electrical distribution system is a simple radial system; 120/208-volt, 3-phase, 4-wire, wye-connected, with a grounded neutral. This relatively low-voltage system was selected, in the face of the trend toward higher in-plant voltages, because the specialized production machines used in the plant come equipped with 208-volt motors. Since the plant load is not heavy—only 1000 kva.—company engineers did not think a change-over was justified.

Power is supplied to the building by dual 4160-volt feeders, each capable—as mentioned earlier—of handling the entire plant load. Manual switching is provided in case one of the feeders fails. Power is transformed to 120/208 volts by three 500-kva. transformers; fed to an enclosed, metal-clad, unitized air circuit-breaker board. The transformer vault is located close to the major production area, minimizing cable losses and voltage drop between transformers and point of use.

At an adjacent control center are located all starters and controls for the air-conditioning, heating, and pumping equipment. All controls have two separate bus-duct feeders—part of the complete standby of mechanical equipment described earlier.

Power is distributed throughout the production area by cable, in both underfloor and overhead networks, as mentioned earlier.

Lighting for the production and warehouse areas is mounted on a combination mechanical support and electrical raceway. This special duct forms a structural support on which fluorescent fixtures can be attached at any point.

Lighting level in both production and office areas is 50 foot-candles, although this can be increased by attaching additional fixtures to the lighting bus.

JUST ABOUT TOPS. That's the reaction when you see this handsome lounge for male production employees.

Employee facilities—How many plants have you seen where male employees are provided with facilities like those pictured above? They typify all of the employee facilities in the plant. Notice on the layout diagram (page B-6) that all of these facilities are located in a way that puts them close to the great majority of the employees—those that work in the large production area.

Directly above the employee facilities is a mezzanine floor which houses tea-testing labs and offices. Lounge and restrooms for office employees are located on this floor. They are directly above the production-floor facilities, thus concentrating piping, ventilation, drains in one area—a cost-saving idea.

B

DISTINGUISHED office structure of Rust Craft plant is in pure New England colonial tradition. But plant proper is as modern as industrial plant buildings come. Plant can be expanded and capacity increased 75 per cent by pushing 250-ft. center section back 96 feet. Three parking areas hold 100 cars apiece. Company has own railroad station.

NO-DRAFT air conditioning, vital at presses and folding machines (above), is provided for 100,000-sq. ft. printing area. Lighting: 50 foot-candles. Rust Craft shaved handling costs by locating presses next to freight dock.

BAND OF WINDOWS on south side of finishing department is departure from otherwise windowless design. Company

can add 25,000 square feet by pushing this wall back. Summer temperatures in this part of the plant are lowered by spraying condenser water on roof.

RUST CRAFT PUBLISHERS
DIVISION OF UNITED PRINTERS AND PUBLISHERS
DEDHAM, MASS.

FOR CITATION, SEE PAGES A-4 AND A-5

Colonial Outside 1965 Inside

FOR A HAPPY BLEND of the traditional with the modern, we take you now to Dedham, Mass.—and the handsome new Rust Craft plant.

You'll find it about a mile from town. On 56 acres of what used to be swampy waste land. But you'd never know it today. You'd scarcely guess that, right after construction started, Rust Craft's nature-loving chairman ordered all work halted to allow a mallard mama to hatch a clutch of eggs!

There's evidence here, we think, that today's new plants don't all have to be "1956 packing-box style." This Rust Craft plant could indeed be another of Dedham's distinguished colonial public buildings—say a schoolhouse. The two-story office structure (50,600 square feet) is in the pure colonial tradition, with white-pillared portico and red-brick clock tower. It's comfort air-conditioned.

Nothing, on the other hand, could be more modern than the plant proper (290,000 square feet). It's a one-story building, 700x415 feet. It's windowless, except for a band of windows on the south (back) end, and perhaps a dozen others for purely psychological reasons. About one-third of the building—the printing area—is air conditioned.

The new plant was built to consolidate operations that had grown to occupy three principal locations in Boston. It cost $3.5-million—about $8.75 a square foot (including air conditioning).

The Rust Craft people say *they expect to cut handling costs 10%*. Also, they add, the present structure can be readily expanded. They say, in fact, that a *10% expansion will enable them to increase production 75%!* The first is possibly the understatement of the year. The second sounds a bit fishy. Let's examine both:

Handling costs down 10%—In Boston, paper was stored on an upper floor of a multi-story building. It had to go up in an elevator. It came down in the same elevator to be trucked half a mile to the pressroom and ensuing operations in a second multi-story building. (By the way, you eat up a lot of paper when you're making a million greeting cards a day.) Here, as in storage, everything that went up had to come down again—this time for a second trip by truck to boxing, order filling, and shipping departments. On the fourth and fifth floors of a third building—a mile away.

Turn the page

B

Begins on page B-10

"A good plant for product, process, and people..."

If the thought of all those ups and downs leaves you slightly dizzy, consider the present method. Paper now arrives by freight car. On skids. It is moved just a few feet to a storage area beside the presses. From there the work flows across the plant to the shipping dock on the far side.

Does this sound like a 10% cut in handling? Or do you go along with our estimate that it may turn out to be more like 25%?

Expandability—Now for that claim that a 10% increase in floor space will increase capacity 75%. It's quite simple. The center third (about 250 feet) of the south wall can be pushed back 96 feet. All underground services are already located back of this line—no pipelines or conduits to tear up. Rust Craft will get the increased capacity by installing a second high-speed 4-color press (at a cost of $175,000). The 25,000 square feet of new floor area will be used to handle the additional load on the finishing departments.

That's not all. The second floor of the office building already extends over one bay of the plant proper. It can be extended one more bay (260x40 feet) without changing footings or columns.

CONSTRUCTION DETAILS

Floors—In the plant, 6-in. concrete (8-in. in press area). Main traffic aisles treated with iron filings; all other floor areas, with liquid floor hardener and sealer. Asphalt tile in cafeteria and office areas. Quarry tile in kitchen.

Walls—Sandwich type. Corrugated aluminum, 1-in. layer of glass fiber, and galvanized sheet. Exterior has an embossed "leatherette" finish that cuts down glare. Two 8-in. common-brick firewalls provide 4-hour fire resistance.

Roof deck—Poured gypsum, with 2-in. foam-glass insulation over air-conditioned areas, 1-in. Celotex elsewhere.

Railroad siding—First thing built. Saved three times its cost because building materials could be shipped in by freight. Railroad dock takes three cars at a time. Truck receiving dock has room for 4 trucks; shipping dock, 8 trucks.

PLANT SERVICES

Air conditioning—A 300-hp. Carrier compressor supplies 400 tons of refrigeration for 100,000 square feet of printing area. Cooled air is delivered through three systems equipped with special air valves that provide even flow without drafts (important in a print shop). Two 60-hp. Carrier units provide 88 tons of comfort cooling for offices, 50 tons for the cafeteria. Both are held 10 degrees below outside temperatures.

Heating—Two 300-hp. boilers and converters provide hot water for ventilating system, perimeter radiation, and unit ventilators and heaters.

Water—City water is augmented by a 2,000,000-gal. reservoir. Two wells supply up to 900 cfm. of 50-deg. water daily for air-conditioning condensers. Half of the water from the condensers is sprayed on the roof in summer.

Electrical—All power is taken in at 13,800 volts. Three transformers reduce voltage to 480. Power is distributed by bus duct. The company says its power

CONFERENCE ROOM (18x34 feet) seats 50 people, 20 around the table. No telephone, so committees or supervisors can meet without interruption. Pegboard along one wall for charts, artwork, etc.

SOUNDPROOFED ceilings in air-conditioned office building. Asphalt tile floors. North walls painted a warm peach, south walls a cool green.

RAILROAD STATION adjoins company property, serves close to 400 commuters from Boston—many of them older, valued workers who might otherwise have been forced to seek other employment. Left, glass-fiber shelter for passengers. Right, reservoir that supplements city water for fire and sanitary uses. Rear end of plant in background.

bill will be 20% lower (in Boston all power was taken in at 220 volts).

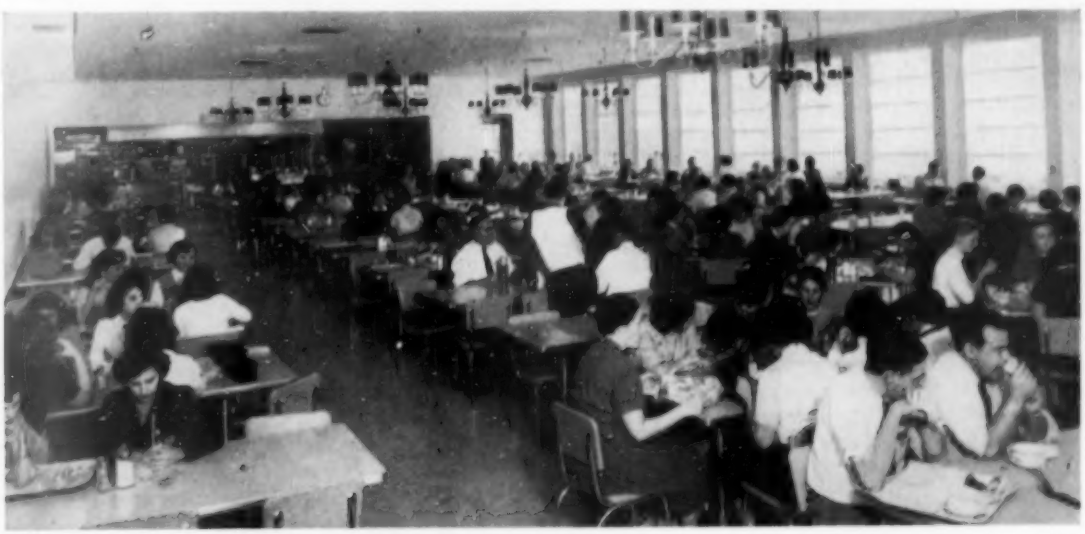
Lighting—Dry transformers provide 277 volts for fluorescent lighting in plant, 120 volts for office and incandescent lighting (used in stock bin areas). Rust Craft tries to maintain 50 foot-candles in all production and office areas.

EMPLOYEE FACILITIES

Cafeteria—Size, 46x120 feet. Seats 400. About 1050 meals served daily—in three 45-min. shifts. Run by a Boston caterer. All-electric kitchen (would have cost $10,000 to bring in a gas main). Full meals, 65 to 85 cents.

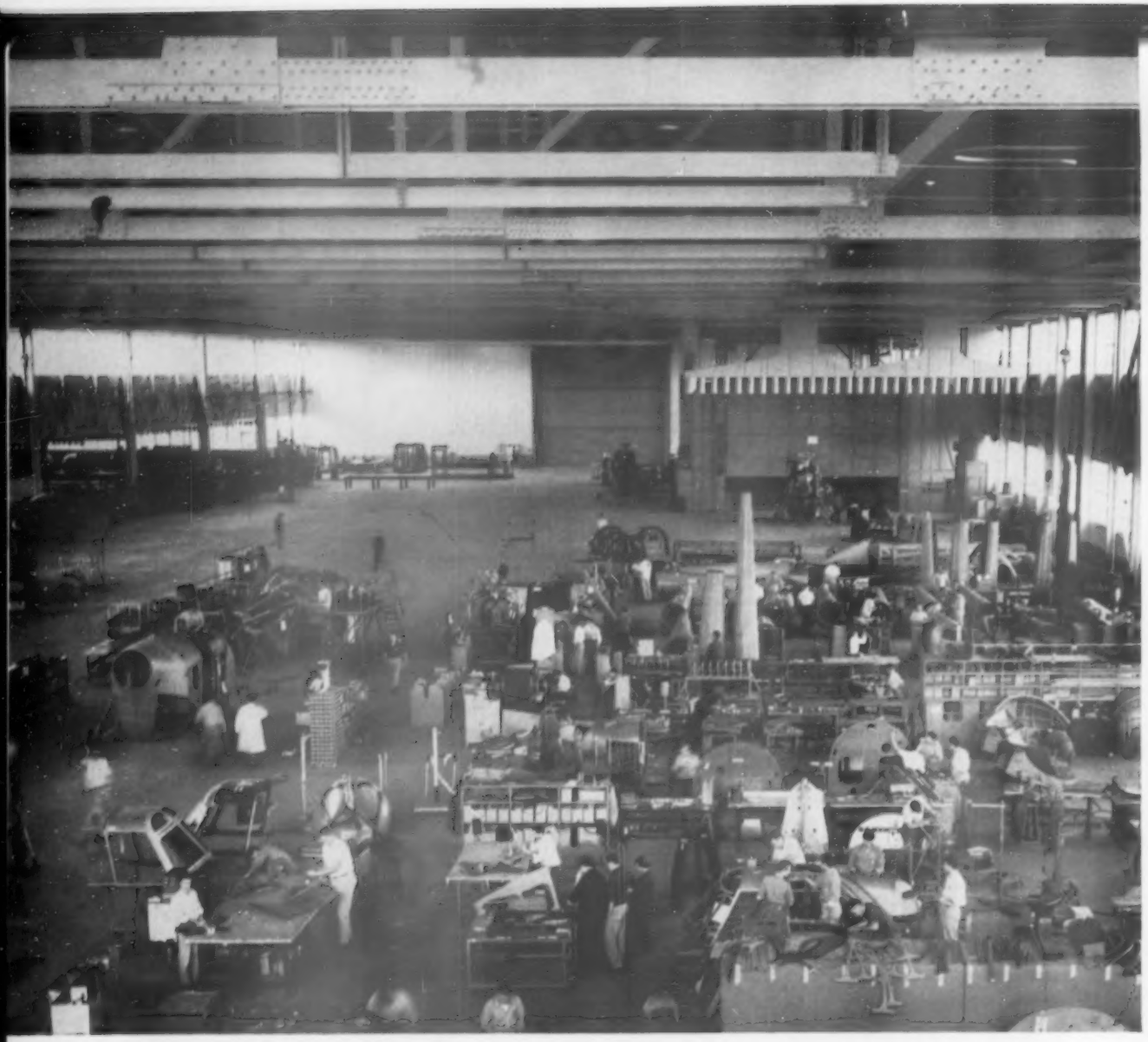
Transportation—Three lighted parking lots, each holding 100 cars. Buses drop employees (about 120 daily) at plant door. Rust Craft has its own railroad station (photo above) patronized by close to 400 people. Makes it convenient for Boston commuters. Kept company from losing many older, valued employees when it moved to Dedham.

Grounds and recreation—Foundation planting completed this spring. About 14 acres of lawn. Attempt to get good stand of grass last year was thwarted first by hot, dry weather, later by Carol and Diane. Employee committees will build their own baseball, softball, horseshoe, and other facilities. There is to be a picnic area near the pond, where workers can eat their lunches in summer.



CAFETERIA for Rust Crafters is big, well-appointed room with handsome lighting fixtures of colonial design. It serves both office and plant people in three 45-min. shifts. Accordion-fold partition blocks off kitchen, converts cafeteria into auditorium equipped to show sound movies. Like rest of office building, cafeteria is air-conditioned for comfort.

B



Big enough to fly in Sikorsky doesn't permit any helicopter flying in this bay, but it could be done. Bay is a whopping 180x600 feet. And it's 36 feet to the bottom chord of the 14-ft.-deep trusses—

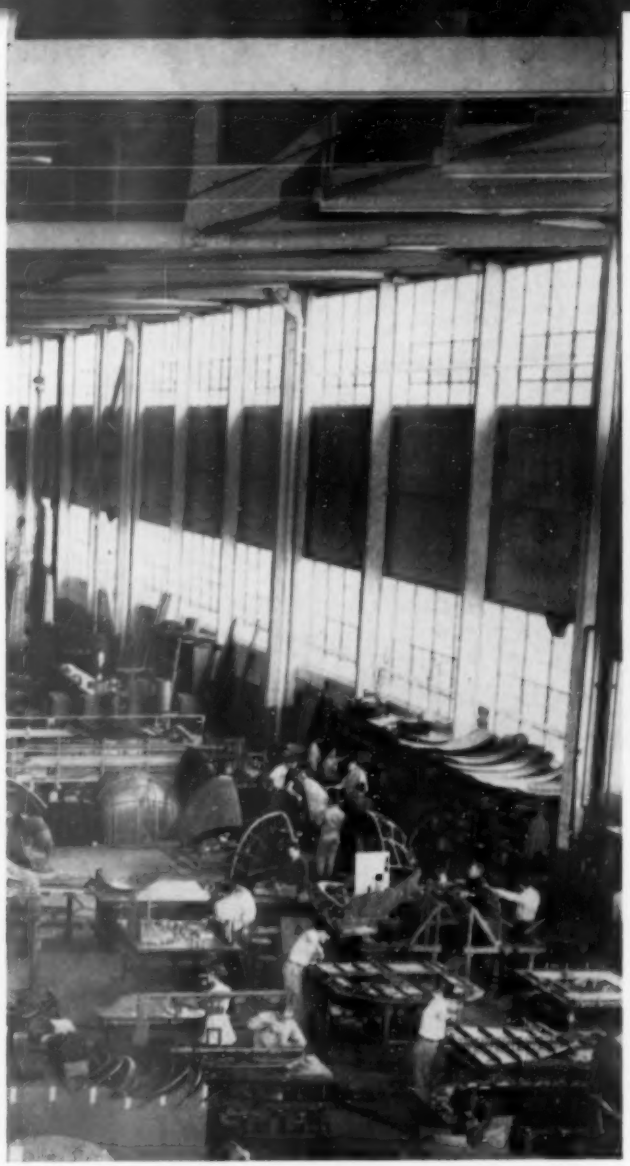
Plant for a Fast-Changing Industry

ORVILLE WRIGHT could have made his epic first flight in this bay—going *across* the bay, not down its length. That was only a little over 52 years ago. Which symbolizes why Sikorsky planned—and paid for—180-ft. clear spans and a great many other features that will guarantee flexibility for a long time to come.

Measured against the durability of brick and steel, the foreseeable future of a given model of helicopter may be short, indeed. Only 10 years ago you could have built the largest model of these fabulous egg-beaters in your garage. By contrast, the military models put into production last year have a greater capacity than the largest pre-World War II standard air transports.

Instead of gambling on the plant's being made obsolete by design changes, Sikorsky sized its assembly area to be capable of building even large multi-jet bombers. Meanwhile, the plant affords a degree of flexibility seldom equaled.

There's more space, too—Simply remove the fire wall at the end of the bay (background), and you



more than twice the height of any of today's whirlybirds. Sikorsky can lay down three parallel lines for assembling its biggest models, still have plenty of elbow room left over.

have another 270 feet with a 180-ft. clear span. This area is currently used as a hangar for craft undergoing inspection and flight test prior to delivery.

Unlike the rest of the plant, in which compressed air and low-voltage (110-volt) power are distributed overhead, these services are located underground in the high-bay section. Pits (where air and power can be tapped off) are located on 60-ft. centers throughout the high bay. Lighting, too, is different here; it's 480-volt mercury vapor mounted in the clear space between trusses.

For handling in the high bay, Sikorsky has installed three parallel 60-ft. Whiting Trambeams running the 600-ft. length of the bay. Each bay-line has two bridges with hoists of 10-ton capacity. Interchange of hoist carriers between runs provides 100% coverage of 88,800 square feet.

SIKORSKY AIRCRAFT
DIVISION OF UNITED AIRCRAFT CORPORATION
STRATFORD, CONN.

FOR CITATION AND EXTERIOR VIEW
OF PLANT, SEE PAGES A-4 AND A-5

The only obstruction in the entire area is a paint spray booth 60 feet wide and 90 feet long (center background). Except for the investment in the downdraft blower system (100,000 cfm.) and underfloor pits for air washing, this unit could rather easily be dismantled and moved to another location. An earlier move, however, would likely be conversion of the hangar into assembly space. In that event, the booth would then be in the center of the outer wall, and have lines feeding to it from both ends of the enlarged area.

Steam-heating coils in the blower system are sized to maintain working temperature in the booth, even during severe New England winters, or permit its conversion to a drying oven. The velocity of the air movement permits painting from both sides of an assembly at one time.

In addition, an area roughly 60-feet square just outside the booth (a painting preparation center) is effectively separated from the assembly area by a high-velocity down-draft air curtain.

Expansion planned for—The steelwork as well as service lines were provided with all necessary connections so that this entire bay could be duplicated (to make two 180-ft. bays) along the east wall of the plant. Foundations of the east wall are adequate to support the load of this additional span.

Similar provision has been made for expansion of the manufacturing area. With only minor modification it can be doubled by creating a mirror of the present plan starting along the north wall.

MANUFACTURING SERVICES

More than half of the manufacturing area is covered by interconnecting cranes. Makes a beautiful handling arrangement. But presents this problem in distributing electrical power, air, and water to point of use: *The overhead must be kept clear of drop lines.* Sikorsky's solution was a neat combination of overhead and underfloor distribution.

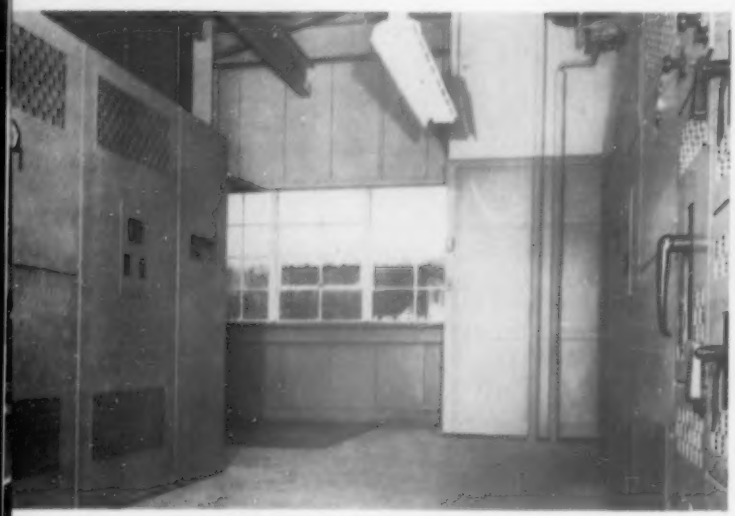
Look at the air lines, for example. A complete overhead loop (8-in. pipe) carries air around the entire area at 100 psi. T's are located every 40 feet, and follow the column lines (above the 16-ft. truss line) to provide a complete grid. Drops are brought down the web on the columns. Feeders are brought out from the columns to the point of use by removing a row of wood block and laying them in. Thus relocation never requires tearing into concrete, merely replacing and removing a run of blocks.

Air for the loop-and-grid system is supplied by one steam- and two electric-driven compressors with a total capacity of 3000 cfm. They are located in the separate power house at the northwest of the main

B

Begins on page B-14

"Services — as flexible as the building itself..."



ALL UNIT SUBSTATIONS—four 1500-kva. and six 1000-kva. units—are located in penthouses. Trapdoor (below window) and craneway are for removing and replacing faulted units.

SPECIAL LIGHTING in lofting areas concentrates output to wavelengths where eye is most sensitive, gives high "see-ability" without excessive foot-candles.

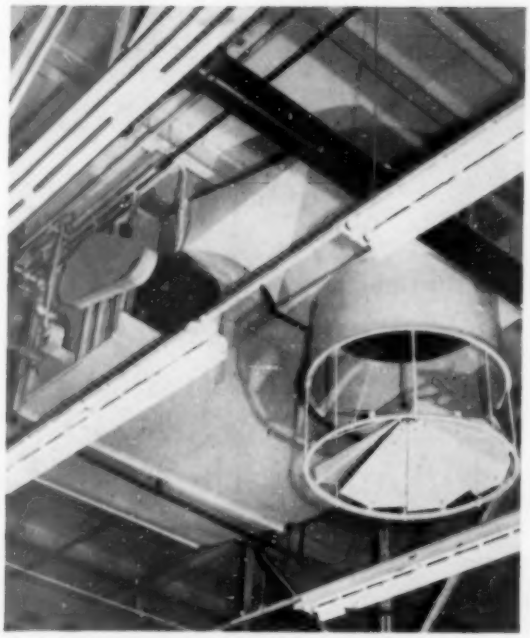
building. Provision has been made for immediate installation of a fourth compressor whenever it may be needed.

Water—for both process and the sprinkler system—is distributed in the same loop-and-grid fashion, but the grid lines were reduced to 6 inches where they are T'd from the 8-in. loop. Pressure from the deluge system in the hangar and spray booths plus sprinklers in 100% of the manufacturing area is triple-protected. The ground-level water supply (Bridgeport reservoir) is about 300 feet above the level of the plant, comes in through oversize mains at 100 psi. A fire reservoir in two 300,000-gal. storage tanks is backed up by a pair of electric pumps, which cut over automatically to two diesels in the event of power failure.

Electrical power—It's brought into the plant at 13.8 kilovolts, reduced to 480 volts by four 1500-kva. and six 1000-kva. transformers located in penthouses. Sufficient capacity was provided so that, in the event of failure, the remaining unit in a pair can be tied in and will carry the full load. At the present time, this can be done without fan cooling, but space has been provided for fans.

Actually, one unit did fail shortly after the plant went into full operation. The load was handled with-

WASTE-TREATMENT PLANT handles both sanitary wastes and acid and alkaline wastes—after they've been separated at the point of origin and carried through parallel systems to this point. Water from the roof drains is carried down to under-floor storm sewers that discharge into the handy Housatonic River (background).



HEATING-VENTILATING system is under automatic damper control to provide positive pressure. Unitary lighting duct will be a cinch to relocate if changes have to be made.

out difficulty. And the arrangement for removing the defective unit through a trapdoor (photo top left, facing page) paid off handsomely.

Most of the additional electric capacity for the transmission test area (remote from the main plant) is provided by cable direct from the main substation. The all-electric kitchen serving the employees' cafeteria has a 150-kva. transformer for direct reduction of 13.8-kv. power to 230 volts.

Distribution in the plant is by means of 600-amp. bus on 70-ft. centers in the machine shop area, 400-amp. bus on 120-ft. center in most other areas.

Power for machines or supplemental lighting is brought down the column webs and carried through raceways laid in the wood-block floor.

BOMB SHELTER. This corridor, off which all employee facilities are located, is reinforced to serve as a bomb shelter for 5000 people. It's under main manufacturing area.

Complete flexibility for ventilation—It was provided by installing 4-ft. square hatches in the roof in the center of each 40x60-ft. bay. Either intakes or exhausts can be located at these points without building alterations, depending upon the load conditions existing in the bay. At the present time many of the hatches are simply capped; perhaps 50% of them have exhaust hoods through which air feeds out under the slight positive pressure maintained in the plant. Over the so-called "process" area near the center of the plant, however, there is forced exhaust of 250,000 cfm. to dissipate heat and fumes from the ovens and high-temperature forming presses.

To maintain a positive pressure against the activity of these forced exhausts, automatically dampered steam-heated blowers located in the trusses bring in a constant supply of make-up air. Additional recirculation unit heaters maintain working temperature in very cold weather.

Auxiliary services—Propane and gasoline storage tanks are located in front of the fire station near the flight field. The radio station, located in the firehouse, also serves the observation tower and the guardhouse.

Hazardous stores are kept in a small separate building near the river. It is protected by an automatic CO_2 system.

Air conditioning has been provided only in the administrative building, laboratory area, and the rotor blade process room.

In the plant itself, foremen's offices are located over the toilets and below the roof-mounted substation penthouses. The individual offices have clear glazing above 36 inches, so that foremen can have a view of the entire surrounding working area.

EMPLOYEE FACILITIES

Employees enter the plant through a single entrance, go down a flight of stairs with access to the locker areas, and then come up near the center of the manufacturing area. This basement walkway and all the rooms off it (lockers, toilets, personnel, guard headquarters) are of extra-heavy construction. In all it's an area about 120x200 feet, overlaid by 12 inches of reinforced concrete. One end of the administration building (about 60x180 feet) has received similar treatment. The two areas could handle upwards of 5000 people in an emergency.

An employee cafeteria seating 550 will have two serving lines, an all-electric kitchen, and a conveyor belt running its entire 180-ft. length to return trays and dishes to the washing room.

Shortly before Sikorsky acquired the land for the plant, a seven-room ranch house was completed near what is now the plant entrance. It will be used as headquarters for the employee credit union.

Along the east side of the plant there are marked parking spaces for 2256 cars. And if the time comes, there's 52 acres of landing field for the use of employee helicopters.

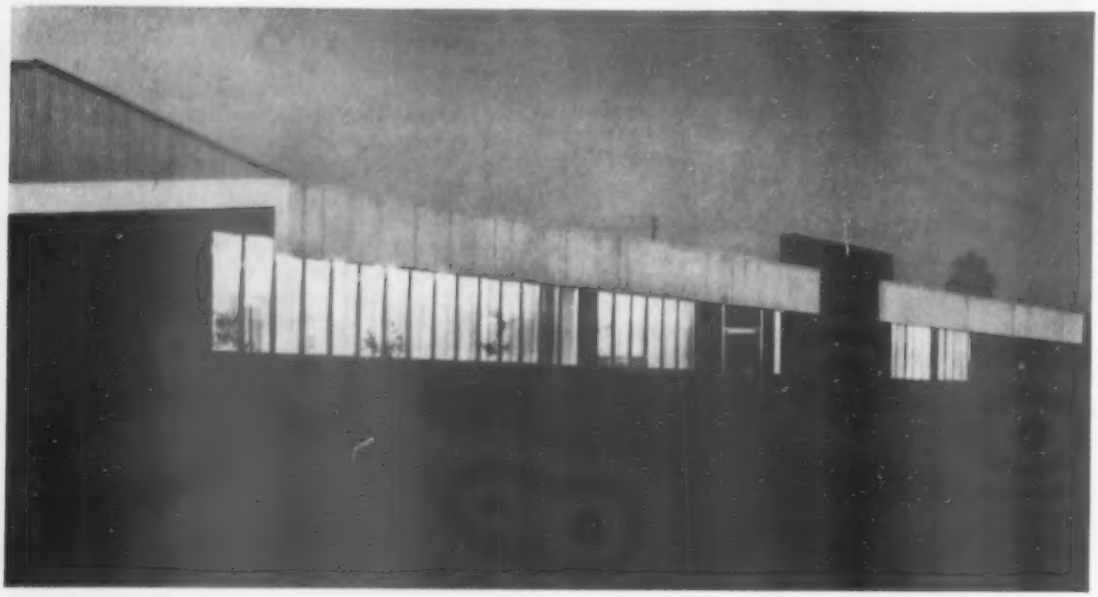
B

BUILDINGS AND GROUNDS

Special Awards . . .

. . . awards made to plants that are outstanding in some one respect, or in which there is an unusual feature of broad significance.

Are These the Handsomest Plants of the Year?



Hunter Engineering Co.
Riverside, Calif.

Low building front is beige stucco, set off by white dividers, white stucco fascia, stone.

ElectroData Corporation
Pasadena, Calif.

Vertical aluminum blinds on windows set off red-brick exterior of well-landscaped plant.

Taylor Instrument Companies
San Leandro, Calif.

Beauty stems from simplicity, frankly exposed structure, and informality.

Continental Division
Ford Motor Company
Ecorse Township, Mich.

Bold modern look is brightened by salmon-colored brick, grey-green porcelain panels.

Servomechanisms, Inc.
Western Division
Hawthorne, Calif.

Japanese-garden landscaping sets off this building of face brick, redwood, and glass.

B

Built-in Public Warehouse

Warehousing a seasonal product like lawnmowers, to permit year-round production, is a pretty obvious step. But Garden State's warehouse is a bonded one, operated for it by a public warehousing agent, and separated from the manufacturing area by a cinder-block wall (door to warehouse shown in photo).

Why do it this way? This type of warehousing permits short-term borrowing of operating capital at low interest rates. Value of inventory of collateral goods is guaranteed. Stock-taking is done by agent, who produces guaranteed inventories monthly. Location of warehouse on plant property saves hauling charges. Garden State does reserve in-and-out storage privileges for material it doesn't own. (For more details, see FACTORY, March 1956, p. 106.)

Garden State Mower Company, Division of U. S. Hammered Piston Ring Co., New Providence, N. J.

Plenty of Conference Space

This new plant has five conference rooms strategically spotted to provide the best service for management, employees, and customers. The list:

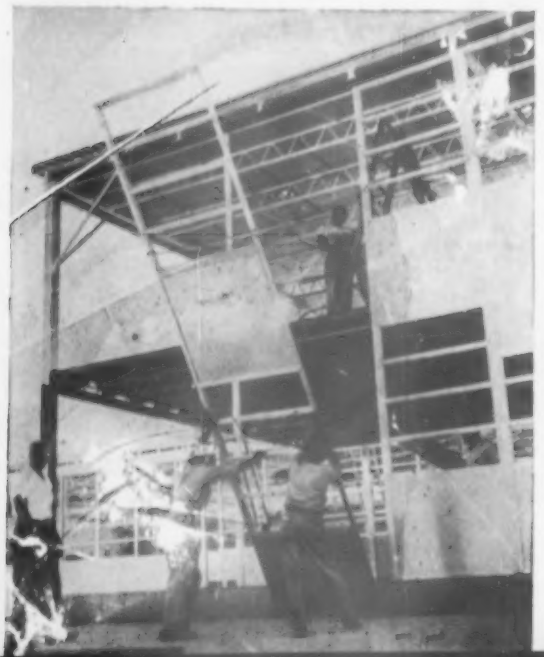
. . . *Management room.* Paneled and cork-floored. Used most for meetings of top management and board of directors. Sometimes, for employee groups.

. . . *Training rooms.* Two of 'em. For year-round training of technicians and customers' personnel in coding, programming, operating, and maintaining electronic computers. Also for special displays.

. . . *Problem analysis room.* Part of technical services area. Enclosed by movable partitions. Used for consulting with customers, analyzing problems.

. . . *Problems preparation room.* Next to the computing center. Used to punch data into tape and to train personnel in coding and programming.

ElectroData Corporation, Pasadena, Calif.



Low-Cost Addition

For only $110,000, another 32,000 square feet of floor space. How? Mostly by using aluminum wall-and-window units, and by closing the end of the new wing with end units from the existing building.

True, the company that used these units (shown at left) also manufacturers them. In the $110,000 they're figured at dealer's cost.

Units are 11 feet, 5 inches high. Aluminum panel is on 4-ft. module, 4 feet high. Panel sandwich includes exterior of 0.032 aluminum sheet, core of 25/32-in. waterproof sheathing board, 3/8-in. sheetrock interior, painted. Panel is secured in unit with aluminum boundary angles. Units are held in place with clips, welded to structural steel.

Saving credited to foresight: Existing washrooms were adequate to handle the extra space.

Brown & Grist, Inc., Warwick, Va.

Pave Your Plant Floor

This standard road-paver is shown here laying the concrete floor of National Homes' new 265,000-sq.ft. plant. And it did the job at a superspeed 50,000 square feet a day. To make sure the job was done right, National Homes had a highway-construction company (L. H. Lacy Company, Dallas) team up with a plant-construction company (Peterson Construction Co., Dallas) to do the job.

Smart—though off-beat—construction techniques like this helped National Homes build its plant in a short six months. And at a price—$3.58 per square foot—that's mighty low even for the warm Texas climate. Estimate of the cost of a duplicate plant in colder climates: $6 per square foot.

(For more details on National Homes' building ideas, see FACTORY, March 1956, p. 133.)

National Homes Corporation, Tyler, Texas.

Room to Grow–Four Ways

California Spring Co. is growing fast. And doesn't ever want its building to get in the way. Here's how that's being assured:

When the plant was built, each department was given 30% extra space, and substation capacity to carry it was installed. Company executives expect this to be enough space for a year or two. (Right now, the expansion area in each department is being used for storage space and for bigger-than-necessary aisles between machines.)

Second piece of expandability insurance: Walls of the 25-ft.-high plant are re-inforced heavily enough to permit building a mezzanine that will project some 50 feet out from the walls of the production area. Why a mezzanine? Because in California Spring's operations it's advantageous to complete the manufacturing process above the production area. The flow of parts for small assemblies and secondary operations can be accommodated quite satisfactorily on the mezzanine while auxiliary conveyor equipment supplies the main floor.

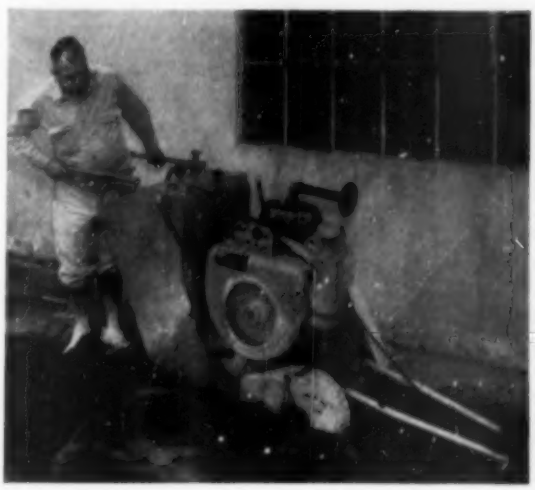
Third step: Structural features provide the strength for a second story that will increase production area by 52%. The second story will not cover the entire main plant.

Finally: With an eye to still more expansion in the far future, the rear wall of the new plant has been built with 20-ft.-wide doors. These doors are strategically placed for addition of another complete building to be attached to the present one.

The present structure—in itself—is a pretty good size. It contains over 70,000 square feet of manufacturing facilities on a 4-acre site. Manufacturing is spread throughout five buildings—but they're all under a single roof.

California Spring Co. Inc., Los Angeles.

Controlled Cracks Cut Cost



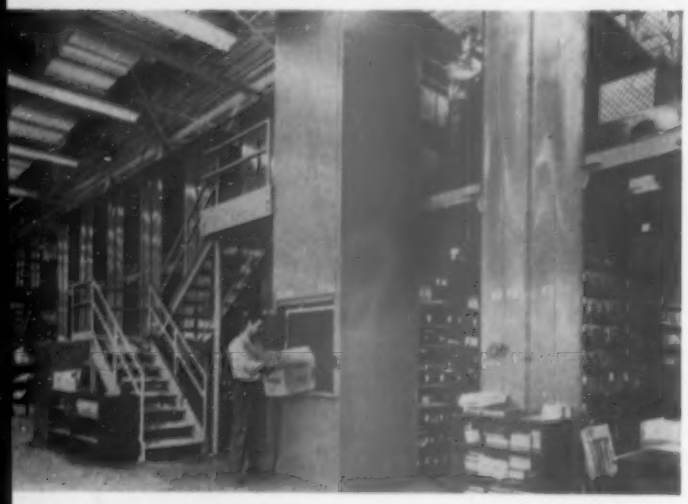
Floor cost, that is. Here's the idea. Make your concrete pours for large floor area in one continuous slab—that saves on forming and spreading. Then come back eight hours later and slice the hardening concrete into optimum size sections—confining the cracks to the contraction joints.

At The Daven Company, the big pour was made in 20x60-ft. sections, then grooved to 20x20-ft. squares. Grooves are 3/16-in. wide, 1½-in. deep. Scoring was done by a Felker Di-Met 7½-hp. gasoline-operated machine using a 12-in. segmented diamond wheel with water. Where water stains had to be avoided, a bonded abrasive wheel was used. Grooves were cut at rate of one lineal foot per minute.

(Floor slab itself is 4 inches thick, reinforced with 6x6-in. wire mesh 2½ inches off bottom.)

The Daven Company, Livingston, N. J.

B

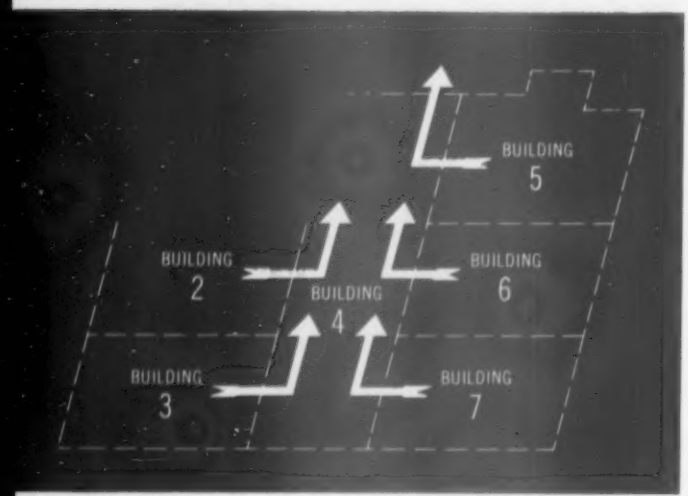


Double-Deck Storeroom

Planners of Western Electric's new Winston-Salem plant wanted 60,000 square feet of storage space near the shipping and receiving room. But didn't want to take that kind of a slice out of available production space. With 17 feet of clearance to the trusses, they were able to build a mezzanine, halving space requirements. Storeroom is directly over shipping and receiving platforms, which are on a lower level that extends under part of main manufacturing floors; is served by a large freight elevator and four 500-lb.-capacity dumbwaiters.

Mezzanine floor is supported by shelving uprights at the 10-ft. level. Walkways are composed of steel roof decking, covered with ⅛-in. sheet vinyl over a 3/16-in. latex underlayment.

Western Electric Company, Inc., Radio Division, Winston-Salem, N. C.



Plant With Well-Planned Future

Present plant of Hightstown Rug Company is relatively small—52,000 square feet (shown solid in diagram). But right from the planning stage, the company designed the building as a keystone for:

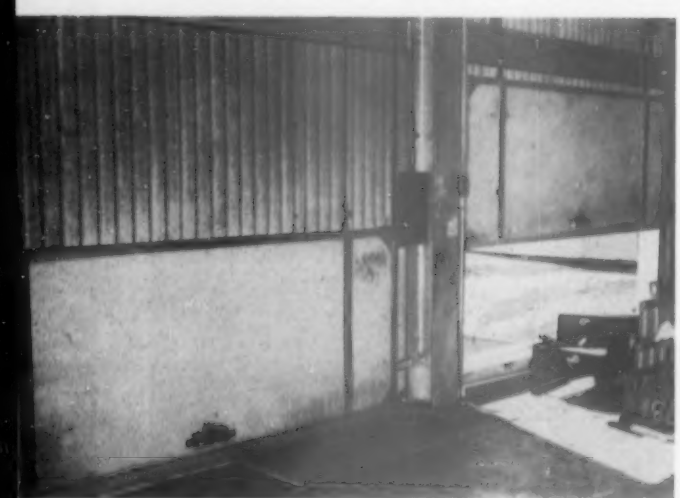
. . . *Expanding production capacity.* As business increases, buildings 2 and 3 will be added to handle the boost in production.

. . . *Consolidating operations.* The company has an older plant in another part of Hightstown—hopes to transfer its operations to the new plant, into proposed buildings 5, 6, and 7.

Building 4 will be a centralized shipping and finished-product warehouse area.

Many building and plant-service features guarantee that the expansion, when it comes, will be easy. For details, see FACTORY, March 1956, p. 127.

Hightstown Rug Company, Hightstown, N. J.



Cool Air for Hot Spots

Here's a hot idea for keeping a forge shop (or any warm area) cool: Bring air in at floor level, let it flow over workers before it rises to the monitor.

In the forge and heat-treating departments of The Bridgeport Hardware Manufacturing Corporation, sliding, counterweighted cement-asbestos wall panels (10 feet wide, 4 feet high) can be hoisted by wire cable along vertical tracks inside wall. Result: a 4-ft. opening at floor level for outside air.

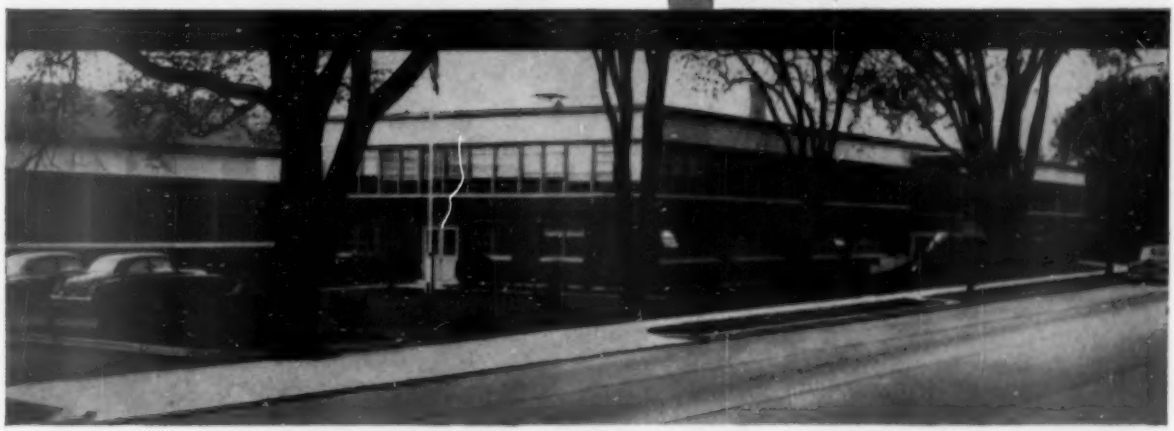
Panels are installed in all bays that have an outside wall—north, south, and east walls of the forge shop, and most of the north wall of the heat-treat department. If windows at higher level had been used, air would not sweep over workers before passing out through the monitor.

The Bridgeport Hardware Manufacturing Corporation, Bridgeport, Conn.

NATCO
STRUCTURAL CLAY PRODUCTS

Fireproof • Maintenance Free
Load Bearing • Permanently Beautiful

The multiple advantages of Natco Structural Clay Products were realized by the Commercial Filters Company when they chose NATCO—for exteriors and interiors—in their plant at Melrose, Mass.



Commercial Filters Company, Melrose, Mass., Morton C. Tuttle Company, Engineers and Builders

8" Nominal thickness

NATCO TEX DRI-WALL TILE WAS USED FOR EXTERIOR WALLS . . . an exceptionally durable wall construction . . . completely fireproof, vermin and termite proof. Its wire cut texture and brick proportions give it the appearance of high quality face brick. Nominal face size 4" x 12". Tile face size 3⅝" x 11⅝". Furnished in red range and flashed red range.

2", 4", 6" & 8" Nominal thickness

NATCO CERAMIC GLAZE VITRITILE WAS USED FOR INTERIOR WALLS—provides a strong load-bearing wall and an attractive interior finish in one operation. No maintenance except occasional soap and water washing to keep the walls like new for the life of the building. Choice of 20 permanently beautiful colors. 6T Series, face size 5⅛" x 11¾"; 8W Series, face size 7¾" x 15⅝"; 4D Series, face size 5⅛" x 7⅝".

NATCO ROMAN FACE BRICK WAS SELECTED FOR THE BUILDING ENTRANCE—a distinctively modern adaptation of the original roman brick—appealing in color and texture. Furnished in pleasing red mingled, flashed red ranges, buff mingled and gray ranges.

Roman Brick
Size—1⅝" x 3⅝" x 11⅝"

Norman Brick
Size—2⅛" x 3⅝" x 11⅝"

Write for Bulletins 8W-455, 6T-1155 and 4D-1255 on Vitritile; DRI-188 on Dri-speedwall Tile; Tex-DW 1 on Tex Dri-wall Tile; RB2-53 on Raggle Block; and Catalog SB-56 on Face Brick.

Write Dept. FMM

Other Natco Structural Clay Products that offer many advantages for industrial building:

DRI-SPEEDWALL TILE—Builds sturdy, attractive load-bearing walls. No painting or repairs . . . no shrinking or cracking. Fast, easy erection saves labor costs. Builds nominal 8" wall. Comes in buff, manganese spot and red textured finishes.

FACE BRICK—provides beauty and variety for modern design requirements, and lends strength and character to buildings. Standard size and Norman and Roman Face Brick are ideal for modern industrial and commercial construction.

RAGGLE BLOCKS (Flashing Tile)—for the critical part of every roof. Provides a perfect seal—no water seepage. Maximum strength and endurance plus minimum maintenance. Furnished in nominal 12" lengths.

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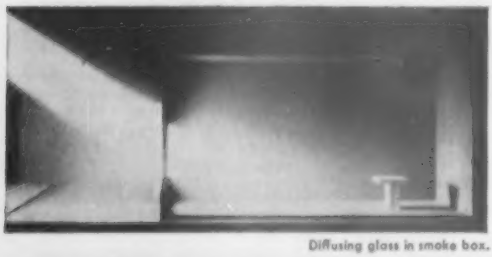
THERE'S MORE TO *daylight* THAN MEETS THE EYE

"Smoke Box" photo—window glazed with clear glass.



Diffusing glass in smoke box.

Directional diffusing glass in smoke box.

Stop Glare and Heat with Light Diffusing Glass

Like other natural resources daylight needs to be controlled to be of greatest benefit. "Raw" daylight seldom meets specific lighting needs, since it contains a host of unwanted factors that cause discomfort and inefficiency. Obtain the results you want by specifying a glass "visioneered" to meet your requirements.

Good daylighting can be achieved with a handsome, modern, diffusing pattern which disperses softened light deep into interiors, provides comfortable, even illumination without harsh glare and sharp contrasts that cause costly eye fatigue. And if excess heat is a problem, keep interiors more comfortable with Mississippi Coolite, heat absorbing, glare reducing glass, which absorbs up to 50% of solar heat rays.

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Never Needs Painting

Often the cost of an all aluminum chain link fence is less than the cost of a rustable metal fence plus one painting. With up to three times the life of other fencing—with maintenance costs eliminated—you can specify aluminum chain link and lower costs.

Reynolds supplies quality aluminum to leading chain link fencing manufacturers. Their names and literature will be sent on request. *Reynolds Metals Company, P. O. Box 1800-NJ, Louisville 1, Kentucky.*

Write for suggested specifications for All-Aluminum Chain Link Fencing.

The Finest Products Made with Aluminum are made with REYNOLDS ALUMINUM

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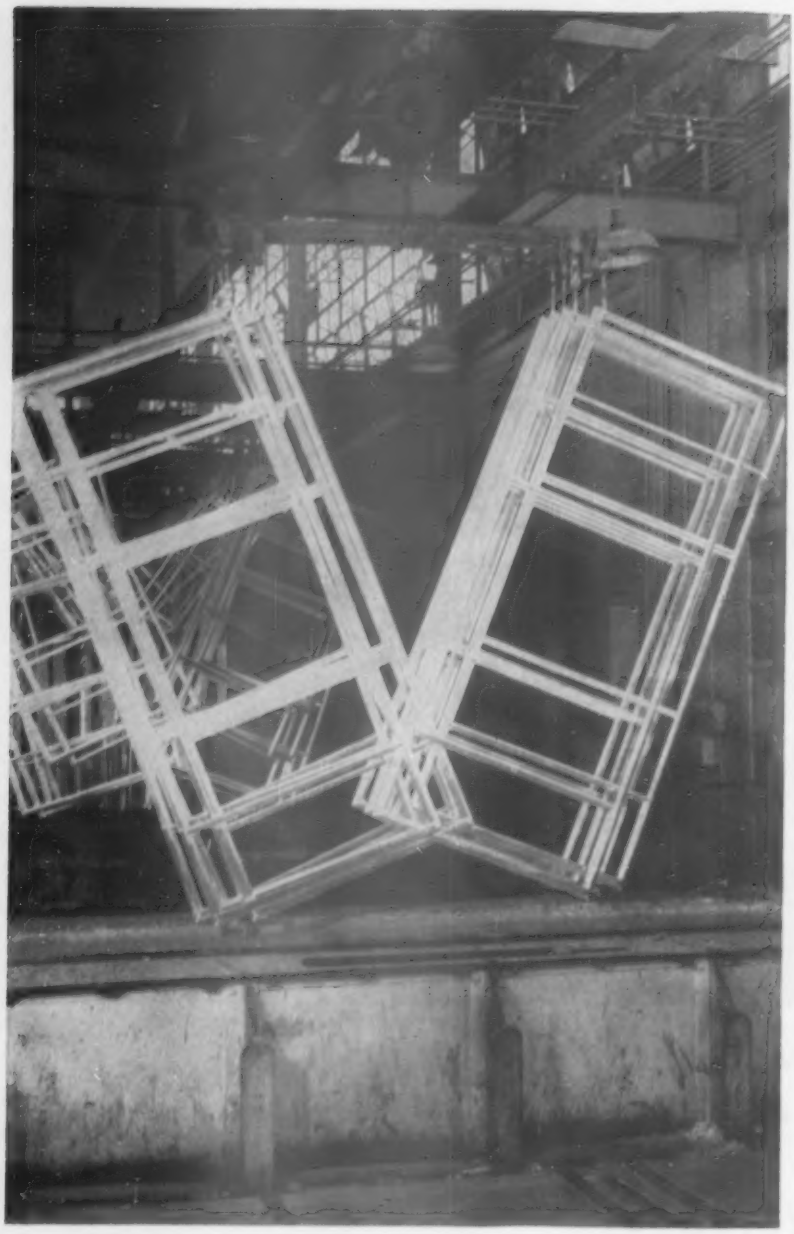


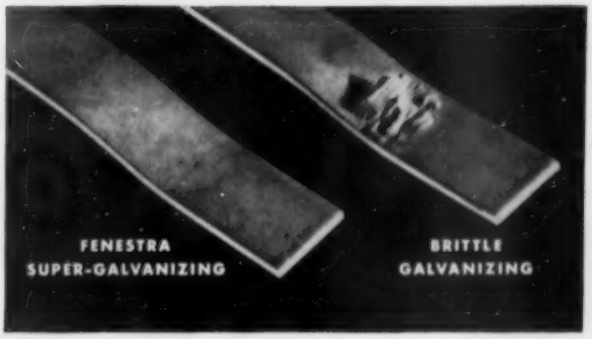
FACTS ABOUT THE FENESTRA

Fenestra Windows are cleaned, pickled, rinsed, fluxed, dried and then galvanized by completely immersing in molten zinc. Bonderizing adds extra protection and a smooth silver-gray finish.

The Fenestra process controls automatically the exact time and temperature for the finest finish.

Fenestra Galvanized-Bonderized Industrial Windows used in this building for John Hassall, Inc., Westbury, New York, to reduce window maintenance costs. Ask your local Fenestra representative for information on the complete line of Fenestra Industrial Windows. *Architect-Contractor*—Winninger Construction Corporation, New York.

This microphotograph shows how the zinc coating alloys with the steel base. Fenestra's Galvanized-Bonderized Finish is *self-healing*—small breaks in the surface are automatically closed by sacrificial action of the zinc, leaving the steel protected underneath!



Bend Test demonstrates the durability of Fenestra Super Hot-Dip Galvanizing. A gradual iron-to-zinc transition from the base metal, through zinc-iron alloys, to the outer layer of relatively pure zinc assures a lifetime bond. Ask your Fenestra representative for this demonstration.

GALVANIZED-BONDERIZED FINISH

Exclusive Fenestra Process gives you steel-strong windows with a self-healing lifetime finish that needs no paint!

Many people ask us, "How long can Fenestra Galvanized-Bonderized Steel Windows go without painting?"

The best answer we know is to refer the inquirer to some of our older installations. Like the Fenestra Windows in Mill No. 2 of the American Woolen Company, Shawsheen Village, Massachusetts. They were installed unpainted 35 years ago and haven't been painted since, inside or out. They're still in excellent condition in spite of extremely high humidity conditions in this building.

Or, the Fenestra Windows in the Galveston Wharf Company building, Galveston, Texas. These windows were installed unpainted in 1926, have never been painted and are in excellent condition after 30 years of fog, pounding storms and destructive salt spray and air.

The pictures on these pages show you why Fenestra Galvanized-Bonderized Windows need no paint. They also show a couple of our customers who will never again need to worry about costly window maintenance.

When you combine all the advantages of the strength of steel with Fenestra's Super Hot-Dip Galvanizing, the result is a window that gives you the lowest lifetime window maintenance cost. And, best of all, the Fenestra Galvanized-Bonderized Finish costs no more than the average 2 coats of field paint.

This lifetime finish is available on all types of Fenestra Windows—Intermediate, Industrial and Residential. Ask your local Fenestra representative for complete information or mail the coupon below.

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Detroit 11, Michigan

Please send complete information on Fenestra Galvanized-Bonderized Steel Windows.

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Firm _____

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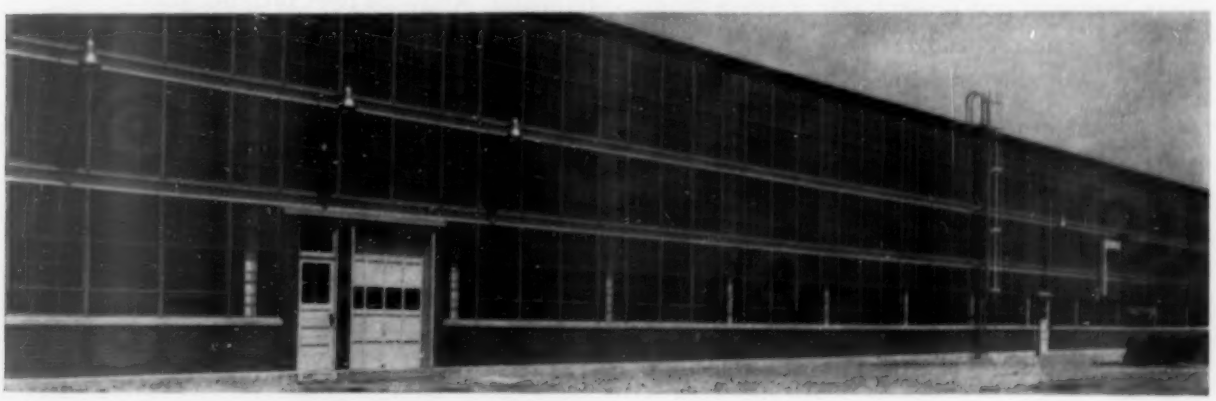
City _____ State _____

Oil Gear Company, Milwaukee, Wisconsin, uses 672 Fenestra Industrial Steel Windows with Fenestra Galvanized-Bonderized finish. Painting and other maintenance costs are virtually eliminated. *Engineer and Contractor*—Klug and Smith, Milwaukee, Wisconsin.



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Special stiff inner construction prevents creeping of mat in front of heavy loads.

Round knob—
Style E-2304 (black)

Zeppelin knob—
Style E-2309 (black)
and Style E-2311 (brown)

Thousands of small knobs forming a pattern give this matting a skidproof surface. This high-quality, fabric-reinforced matting kills noise and protects floors from abrasion and heavy traffic. Lasts a long, long time. Specify Style E-2304.

Where grease and oil are encountered or electrical equipment must be insulated, specify U. S. Zeppelin Knob Matting, Styles E-2309 black or E-2311 brown. This all-neoprene, non-slip, fire-retardant matting is resilient but sturdy. It is certified to 40,000 dielectrical resistance in accordance with A.S.T.M. specifications. Reduces foot fatigue, yet is highly resistant to abrasion.

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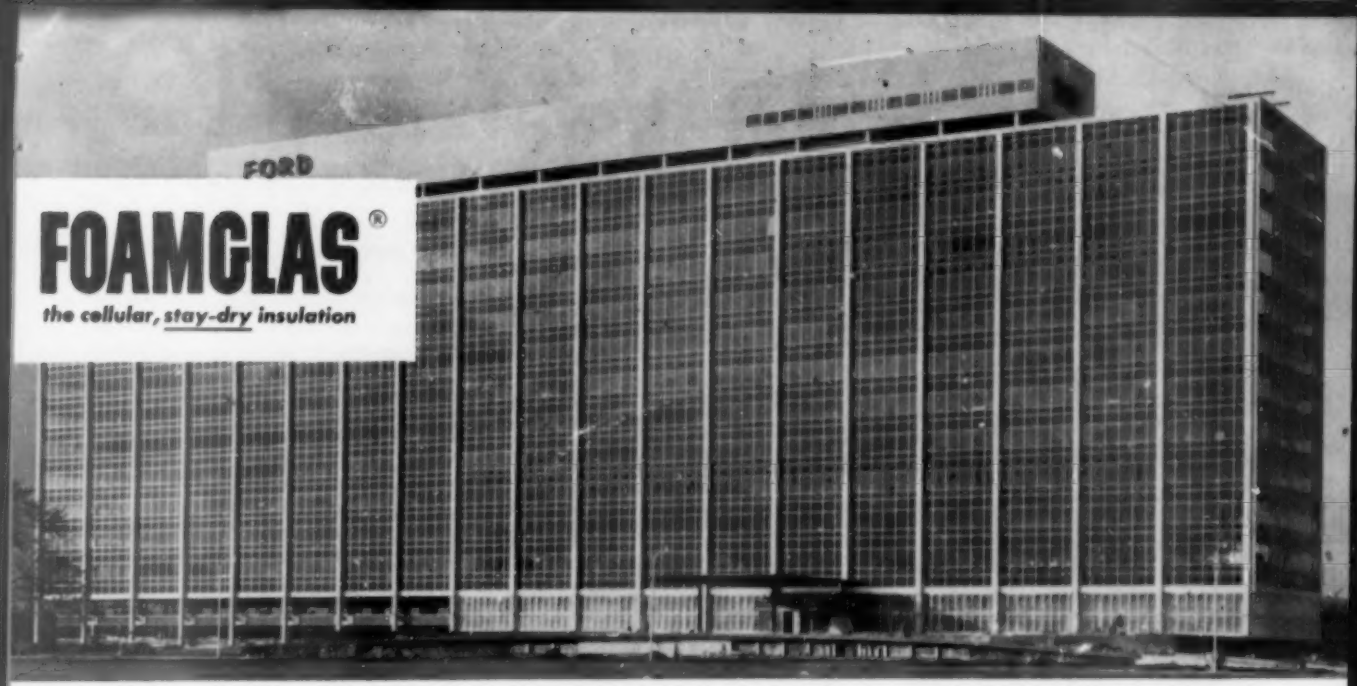

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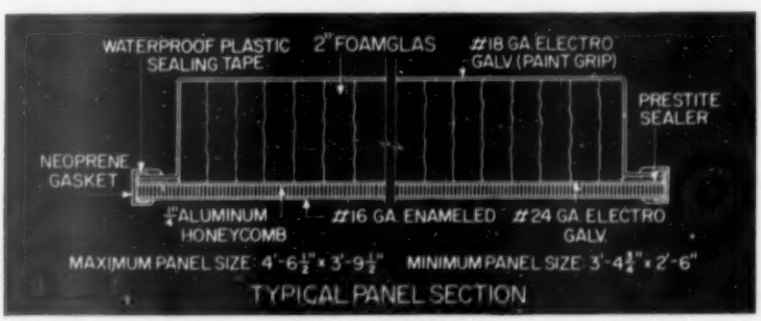
FOAMGLAS-porcelain panels give FORD durable curtain walls with constant U-value

As up-to-the-minute as the Ford family of fine cars . . . the Ford Motor Company's new $30,000,000 Central Staff Office Building at Dearborn, Michigan, demonstrates the functional simplicity of design possible with curtain wall construction. An integral feature of the 6,616 prefabricated porcelain enamel curtain-wall panels is the 2" insulating core of FOAMGLAS to provide vital structural and thermal benefits.

Since FOAMGLAS is impervious to moisture, insulating value remains unchanged under all weather conditions. Ford can count on a constant U-factor of 0.15 for the finished panels. What's more, FOAMGLAS is completely inorganic, dimensionally stable and will not deteriorate in service. It's fireproof, too, for extra building safety.

With a compressive strength of over 7 tons per sq. ft., FOAMGLAS withstood all laminating pressures required to make each panel a sound structural unit. Its light yet rigid structure helped strengthen the finished units while weight was held to just 7½ lbs. per sq. ft.

Each panel unit was inserted in a preformed rabbet in the building's aluminum grid frame. An aluminum stop moulding was then screwed into the frame and topped with a cover moulding. Panels were installed at the rate of 4 per hour for a final erected cost of only $4.25 per sq. ft.



TYPICAL PANEL SECTION

Architects: Skidmore, Owings & Merrill, A. I. A., New York, N.Y.
Consulting Engineers: Jaros, Baum & Bolles, Inc., New York, N. Y.
General Contractor: Bryant & Detwiler Co., Detroit, Mich.
Panel Manufacturer: Ingram-Richardson Mfg. Co., Beaver Falls, Pa.

Ford also took full advantage of the outstanding insulating performance of FOAMGLAS by using it to insulate all roof areas and exterior columns in the new building. Whatever your own insulating problems, it will pay you to send today for detailed literature on the use of cellular, stay-dry FOAMGLAS . . . the strong inorganic insulation for panels, roofs, ceilings, walls, floors, piping or equipment. Write us, specifying your insulating problems. Address:

Pittsburgh Corning Corporation

Department M-46, One Gateway Center
Pittsburgh 22, Pennsylvania
In Canada: 57 Bloor St. W., Toronto, Ontario

Two New Catalogs Answer Your Needs For Door Efficiency

Here's your up-to-the-minute information on doors that cut operating costs, look better *last longer.*

KINNEAR Steel Rolling Doors

— with the coiling upward action of interlocking steel slats *(originated by Kinnear)* — are illustrated and described here in every detail. Also complete data on Kinnear Steel Rolling Fire Doors *(labeled by Underwriters' Laboratories, Inc.)* and the upward-acting Kinnear Steel Rolling Grilles, the attractive steel-bar-and-link protection that admits light, air and vision. Full details on Kinnear Motor Operators, too!

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— the better-built, sectional-type doors of either wood or all-steel construction. Available with provision for glass in any number of panels. Full range of sizes for residential, commercial and industrial needs. Also details on motor operators and controls!

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FACTORY | CATALOG NEWS

BUILDINGS and GROUNDS

OTHER SECTIONS:
Electrical Distribution ..... p. C-32
Plant Services ..... p. D-31
(See also Part 1, p. 120)

1—Movable Metal Walls. Catalog No. 56, is a 68-page workbook of information on flexible interiors. Contains more than 50 photos of typical installations of three types of walls. Covers design and construction features. Includes accessories and hardware. *Mills Co.*

2—Electrified Floor Systems. Here's the story on a system that's not only a floor, but provision for electrical wiring. Catalog M-56 also tells you how it may be used without electrification for long span decks and acoustical ceilings. 24 pages. *R. C. Mahon Co.*

3—Steel Buildings. Two catalogs are offered on two series available in several models. Photos show a variety of applications, from small, temporary structures to large, permanent plants. Erection details. 24 pages in each. *Armco Drainage & Metal Products, Inc.*

4—Overhead Doors. Wood doors are featured in this 16-pager. Included are a vertical lift type, electric door operators, and chain hoist. Drawings show construction details for extra clearance, low headroom, wood and steel jamb. Catalog No. 25. *McKee Door Co.*

5—Structural Stainless Steels. Booklet presents materials for exterior walls; facing systems; flashing, roofing, drainage. Data on types, properties, forms, finishes, fabrication, specs, etc. 12 pages. *Allegheny-Ludlum Steel Corp.*

6—Tar Coatings. Here's the story on "Bitumastic" tar base coatings that are impermeable to water or water vapor. Booklet suggests use

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Where appearance is important!

ALUNDUM Aggrégate in terrazzo means attractive appearance as well as safety for people coming in from the street in all kinds of stormy weather.

IN THE WASHROOMS

Where wet floors are a hazard!

No slipping on this washroom floor. ALUNDUM Aggregate, an integral part of the floor, makes a non-slip surface even when covered with soapy water.

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Where resistance to wear is vital!

ALUNDUM (C. F.) Aggregate for cement floors will withstand highly concentrated traffic year after year and provide a permanently non-slip surface even when covered with water, oil or other liquids.

See Sweet's File or write for your own copy of the new edition of catalog 1935-B.

NORTON

NON-SLIP AGGREGATE

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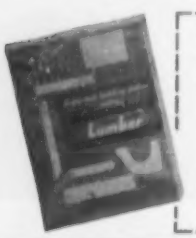
Maine tannery solves construction problem ...with Wolmanized® lumber

At South Paris, Maine, a $2 million processing plant was recently completed for the A. C. Lawrence Leather Company, a division of Swift & Co., Inc. When selecting the material for the roof framing pictured here, the Company's engineers were faced with an unusual situation.

Chemical fumes and high humidity, common to all tanneries, would quickly corrode exposed metal. This same dampness would make ordinary wood decay. So, after careful deliberation, A. C. Lawrence Leather Company's engineers specified Wolmanized lumber. This *protected* lumber was used for the prefabricated monochord trusses, bracing, purlins and decks—over 600,000 board feet in all.

Wolmanized lumber is *fully* protected against dampness, termites and rot by pressure-treatment with a chemical preservative. Under conditions of severe exposure, it lasts five times longer than untreated wood. Wolmanized lumber, therefore, is widely used in factories, homes, schools and hospitals. Send coupon for free booklet, or ask for any specific technical data you want. Koppers Company, Inc., Wolman Preservative Department, Pittsburgh 19, Pennsylvania.



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FACTORY / CATALOG NEWS
Begins on page B-30

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on buildings and equipment to prevent corrosion of metal, deterioration of concrete and masonry. 12 pages. Form T97-55. *Koppers Co.*

7—Roof Deck. Details on deck that provides an attractive ceiling, a modular system of floating panels; eliminates field painting; reduces maintenance costs; improves lighting. Aluminum and porcelain-enameled steel deck featured. 8 pages. *Reflectal Corp.*

8—Fibrous Glass Panels. Application photos in this folder show how you may use these translucent panels as counterpart of regular roofing or siding structural sheet to provide large lighting areas. Includes fire-retardant panels, shatterproof glazing. *Resolite Corp.*

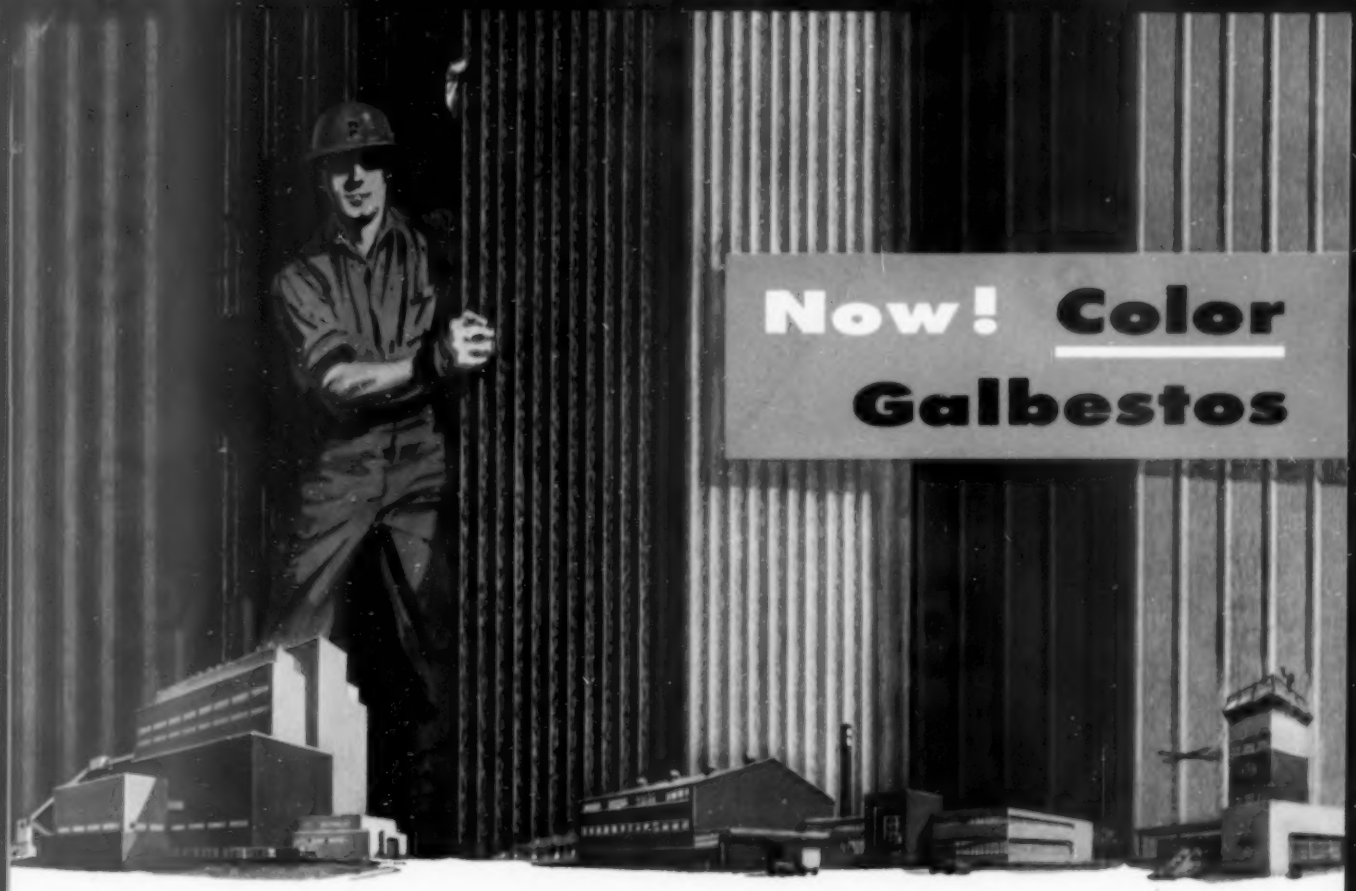
9—Steel Windows and Doors. 36-pager presents many types of projected and casement windows; plus security and pivoted windows, and window-walls. Includes doors, window operators, screens. Drawings of installation details, layouts, and sizes. *William Bayley Co.*

10—Fiberglas Materials. Among the types described and illustrated in this 12-page booklet are panels, built-up roofing, dust-stop air filters, electrical apparatus, pipe and block insulation. Brief listing of other related products. *Owens-Corning Fiberglas Corp.*

11—Pre-Engineered Metal Buildings. Many sizes, types, and designs are pictured in this 16-pager. Eleven construction features that give permanent, weather-tight protection are described. Time- and money-saving advantages are discussed. Accessories. *Butler Mfg. Co.*

12—Rolling Doors. Bulletin No. 79 presents six types: steel rolling service doors, fire doors and shutters, bifold doors (steel or wood), steel rolling grilles, sectional overhead doors (steel or wood), special doors. 24 pages. *Kinnear Mfg. Co.*

Turn the page



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Low cost, maintenance-free beauty for your roofs and sidewalls . . .

After decades of research and more than seven years of exhaustive tests held under the auspices of its multiple fellowship at the famed Mellon Institute of Industrial Research, H. H. Robertson Company is proud to announce Galbestos roofing and siding in four attractive new colors—red, green, buff, gray. Galbestos in black or maroon has long been the standard of perfection among protected metal roofing and siding materials for its maintenance freedom, long-life resistance to fire and corrosion, and ability to withstand extreme weather conditions. Color Galbestos has proven itself equal or better in every respect.

With Color Galbestos you now can have colored roofs and sidewalls at a lower cost than that possible by any other means. These new colors and the three standard corrugations shown at the right, used singly or in combination, open a new field of decorative treatment for industrial and commercial structures. Use the coupon to write for literature.

The exclusive Galbestos method of protecting steel is responsible for its extreme durability. Color Galbestos can be furnished colored on one or both sides . . . in flat sheets or in corrugations shown below.

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Pioneering in World Wide Building Service Since 1906

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In plant construction, as in chess, no two problems are exactly alike. The requirements of one industry are often radically different from those of another.

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We can handle every phase of the job, from selection of the site, engineering, design—right through construction and actual placing in operation of the plant.

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Fire strikes <u>two</u> box plants . . .

A SIX-ALARM FIRE in this unsprinklered paper box plant rages out of control. Within two hours the blaze, fed by tons of baled paper, had gutted the 5-story brick building. The loss was reported at $400,000.

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COULD YOU SURVIVE a disastrous fire? Would insurance fully reimburse you for the loss of buildings, equipment, records, trained personnel — in short, *your ability to produce?*

Grinnell Sprinklers, operating with automatic certainty, stand ready day and night to stop fire when it starts . . . during those first few moments when a little water will do what *tons* of water often cannot accomplish later.

In terms of losses from fire, the cost of Grinnell protection against fire is small. When you consider that the installation of a Grinnell Automatic Sprinkler System reduces fire insurance premiums from 50% to 90%, it will be recognized as an investment that pays for itself within a few years, and then starts paying you substantial cash dividends.

We shall gladly survey your property and submit an estimate, without cost or obligation. Write or phone us. Grinnell Company, Inc., 262 West Exchange Street, Providence 1, Rhode Island.

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Manufacturing, Engineering and Installation of Automatic Sprinklers since 1878

LOW COST TRANSWALL®

Here's the new *low cost* solution to draft problems in your factory.

Use TRANSWALL at shipping exits, traffic outlets, receiving entrances, etc. . . . for effective protection of nearby workers.

TRANSWALL's *ready retractability* lets you slide curtains out of the way when not in use . . . giving free use of floor space. No need to build costly temporary partitions during winter and then tear them out in summer.

TRANSWALL is easy to install. Nylon rollers support the curtain in overhead track. TRANSWALL is available in custom sizes to suit specific needs. Many possible combinations permit great versatility in layouts.

Write for Complete Information. Let our engineers suggest the TRANSWALL layout to solve your draft problems. No obligation.

This TRANSWALL Draft-Stopper at the Ford Motor Company's new car assembly plant in St. Paul, Minn. protects workers from icy winter drafts at service doorway. No costly airlocks or heating devices are needed.

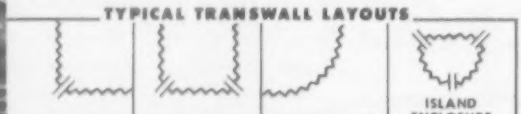
Make Your Plant NOISE-SAFE

TRANSWALL Curtains Reduce Factory Noise as Much as 22 Decibels...

A TRANSWALL Curtain 20 ft. wide retracts to only 2 ft.

Noise is costly . . . control it with TRANSWALL. Here's the low cost sound barrier that isolates noise areas *anywhere* in your factory . . . see typical layouts below. Layouts may be readily changed to suit new floor plans, yet noise reduction makes 95% of factory areas noise-safe.

TYPICAL TRANSWALL LAYOUTS



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Gentlemen: Please send me complete information on TRANSWALL: ☐ NOISE CONTROL ☐ DRAFT CONTROL

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Begins on page B-30

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13—"Lumenated" Ceiling. Booklet LC-17 features a ceiling of plastic panels that provides uniform, shadow-free lighting; modern interior design; streamlined appearance. Data on air conditioning with this ceiling, installation, specs. 8 pages. *Thermotank, Inc.*

14—Timber. "Specify Timber" is designed to show how you can build better, faster, more economically with timber. Photo booklet shows wide variety of structures using three designs. Includes information on framing anchors. 24 pages. *Timber Engineering Co.*

15—Plastic Panels. Reinforced fibrous glass and nylon panels are featured in this 8-page booklet. Many uses, both indoors and outdoors, are pictured. Covers advantages, types and sizes, technical data, construction details, accessories. *Filon Plastics Corp.*

16—Piping. Underground and overhead prefabricated insulated systems are the subject of this 24-pager. Types for central heating, space heating, processing, air conditioning, generating electricity, piping viscous fluids are shown. Specifications. *RicwiL Inc.*

17—Coatings. Catalog 54a presents many types for protecting, decorating, and correcting undesirable conditions in walls, floors, foundations, roofs, pipelines, stacks, interior and exterior wood and steel surfaces. Specification booklet, too. 32 pages. *Tnemec Co.*

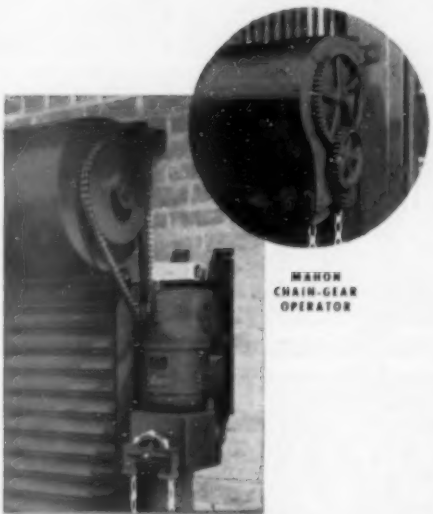
18—Walls and Panels. Catalog W-56 features insulated metal walls and prefab wall panels. Discusses materials, construction, thermal properties, and acceptance of several types. Drawings show typical construction details. Specifications. 12 pages. *R. C. Mahon Co.*

19—Aluminum Products. Five booklets are offered on wall systems, roofing and siding, and various con-

Turn to page B-42

Rolling Steel Doors

Manually, Mechanically, or Electrically Operated



MAHON CHAIN-GEAR OPERATOR

MAHON STANDARD POWER OPERATOR 920-P

In the combination truck and railroad opening illustrated below, two Mahon power operated rolling steel doors, with a movable mullion between, solved the problem of an extremely wide opening in which the entire width was required only occasionally for passage of railroad cars. The railroad spur track entered the building at an acute angle which necessitated an opening 36'-9½" wide for required clearance. It was also necessary to have a truck opening 14'-0" wide at the same location—hence the two doors. The 14 ft. door at the left operates normally as an individual door in general service as a truck opening. When it is necessary to use the entire railroad opening, both doors are opened and the movable mullion is unlocked and moved clear to the right on an overhead track. Rolling Steel Doors make ideal closure walls for craneway openings . . . they make economical, space-saving roll-up dividing walls for school gymnasiums . . . they provide an ideal means of controlling ventilation when installed in exterior walls of steel mills, foundries, pumping stations, and booster stations. When you have a special problem, consult Mahon engineers. When you buy a rolling steel door, check specifications carefully . . . you will find many quality and design features in Mahon Rolling Steel Doors that add up to a greater over-all value. See Sweet's Files for complete information including Specifications, or write for Catalog G-56.

THE R. C. MAHON COMPANY • Detroit 34, Michigan

Sales-Engineering Offices in Detroit, New York and Chicago • Representatives in Principal Cities

Manufacturers of Rolling Steel Doors, Grilles, and Automatic Closing Underwriters' Labeled Rolling Steel Fire Doors and Fire Shutters; Insulated Metal Walls and Wall Panels; Steel Roof Decks and Long Span M-Decks; Permanent Floor Forms; and M-Floors (Electrified Cel-Beam Floor Systems).

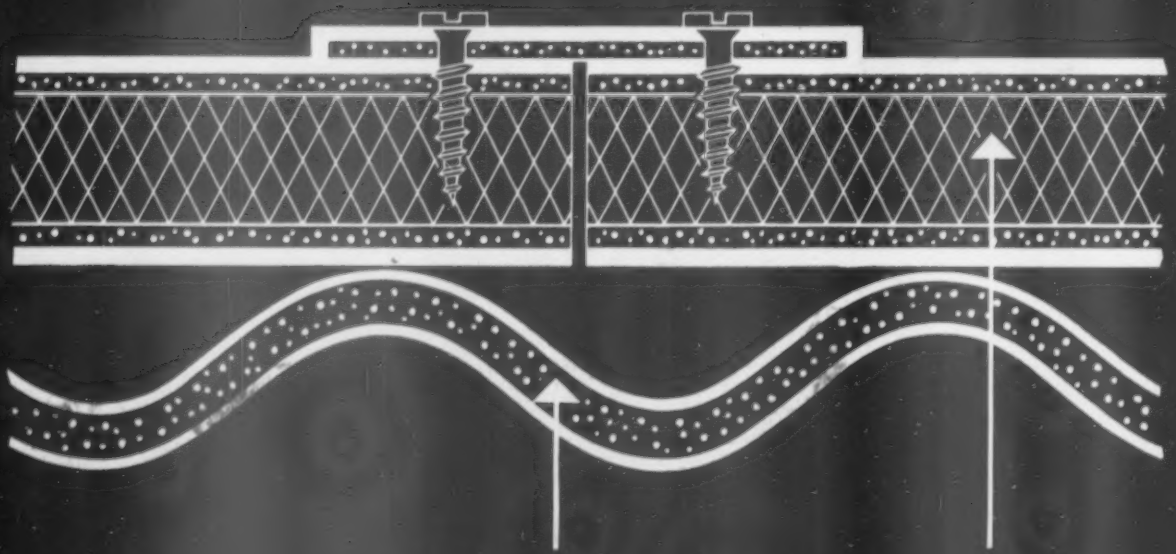
ROLLING STEEL DOORS, SHUTTERS AND GRILLES TO MEET EVERY REQUIREMENT

Two Mahon Power Operated Rolling Steel Doors, with movable mullion between, installed in a combination truck/railroad opening 36'-9½" x 23'-0" in a new building for the Fitzsimmons Manufacturing Co., Detroit, Mich. Barton-Malow Co., Detroit, Mich., Gen. Contrs.

MAHON

CAREY THERMO-WALL

This is CAREY THERMO-WALL CONSTRUCTION



Exterior Sidewalls of 4.2 Careystone Corrugated.

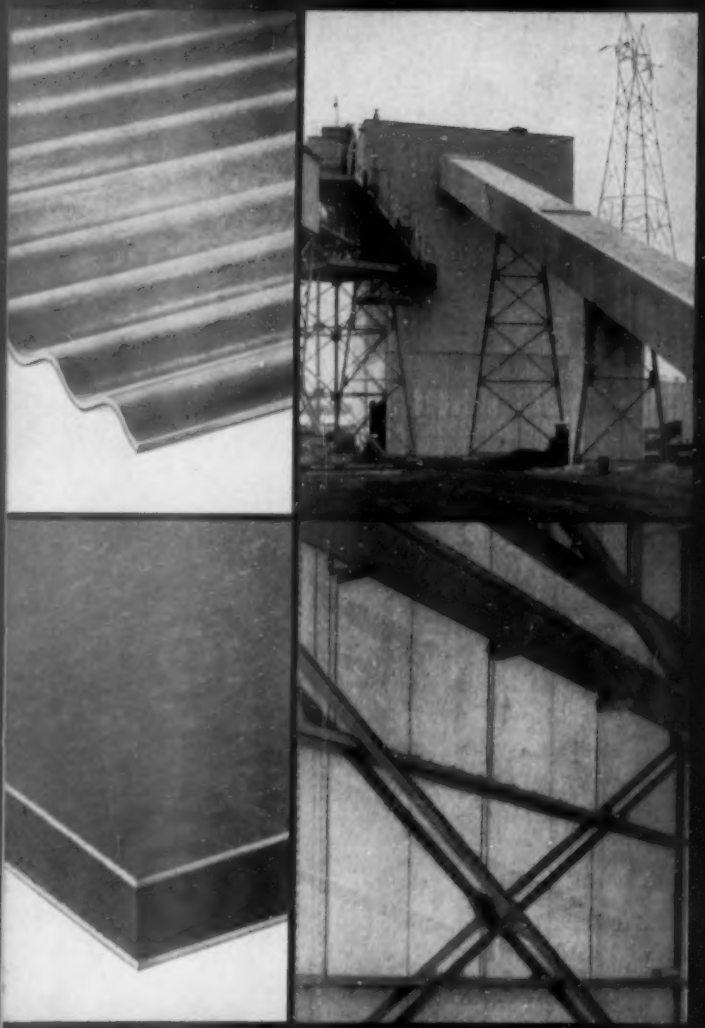
Finished Interior Asbestos-Cement Wall Surfaces of Carey Thermo-Bord (Including 7/8" Fiberboard Insulation).

This Is What CAREY THERMO-WALL CONSTRUCTION Offers Your Clients:

- Savings up to 200% in Sidewall Costs
- Permanent, Attractive Wear-Proof Exterior and Interior Surface
- High Insulating Efficiency
- Asbestos-Cement Construction—Eliminates Maintenance Worries
- Lightweight, Easy to Erect . . . No Special Equipment Required

SAVES UP TO 200%

On Insulated Sidewall Construction!



The above photos show Carey Thermo-Wall Construction in action on a new midwestern power plant. Careystone Corrugated (top) for permanent, attractive exterior sidewalls . . . Carey Thermo-Bord (bottom) for finished interior wall surface and insulation.

- **Combines exterior and insulated interior sidewalls in one unit . . . from one source for prompt delivery!**
- **The fine appearance and permanence of asbestos at a fraction of the cost of comparable panel construction!**

This combination of two, famous easy-to-erect Carey products cuts material requirements and job time. Tough and rigid . . . Thermo-Wall won't rust, rot or corrode. Painting is never required! Get full details on revolutionary Carey Thermo-Wall Construction from your Carey Industrial Sales Engineer. . . .

. . . or write direct to Dept. FMM-4

THE PHILIP Carey MFG. COMPANY
Lockland, Cincinnati 15, Ohio

BETTER PRODUCTS FOR BUILDING SINCE 1873

THE GREATEST ENGINEERING ADVANCE IN POWER EXHAUSTERS SINCE LOW CONTOUR DESIGN

NEW JENN-AIR

Quiet-tested ROOF EXHAUSTER

WITH U-SPRING CUSHION SUSPENSION MOUNTING

The new Quiet-Tested Roof Exhauster design carries out the same graceful low contour-lines so popular in all Jenn-Air Aluminum Exhausters. U-Spring Cushion Suspension Mounting eliminates the transmission of vibration and motor hum to the base of the unit, thus achieving a quietness never before possible. Patents pending.

Jenn-Air Exhausters on production line moving up for testing. Every Unit is line-lab tested for vibration, sound, motor load and insulation break-down before leaving the plant.

Here is the Vibronic Eye test chamber along the production line. Through the window is shown a Quiet-Tested Exhauster which has just moved into position for testing. This final check eliminates the element of human error.

Here's a new "hush-hush" product that *isn't* being guarded against discovery . . . in fact, Jenn-Air unwraps its exclusive Quiet-Tested Roof Exhauster for all to see . . . *NOW*. It is hailed as the most significant engineering advance in power exhausters since low contour design—a Jenn-Air First. Now, for the first time, a power exhauster is offered that's truly quiet.

U-Spring Cushion Suspension Mounting Cuts Vibration—Lowers Noise Level

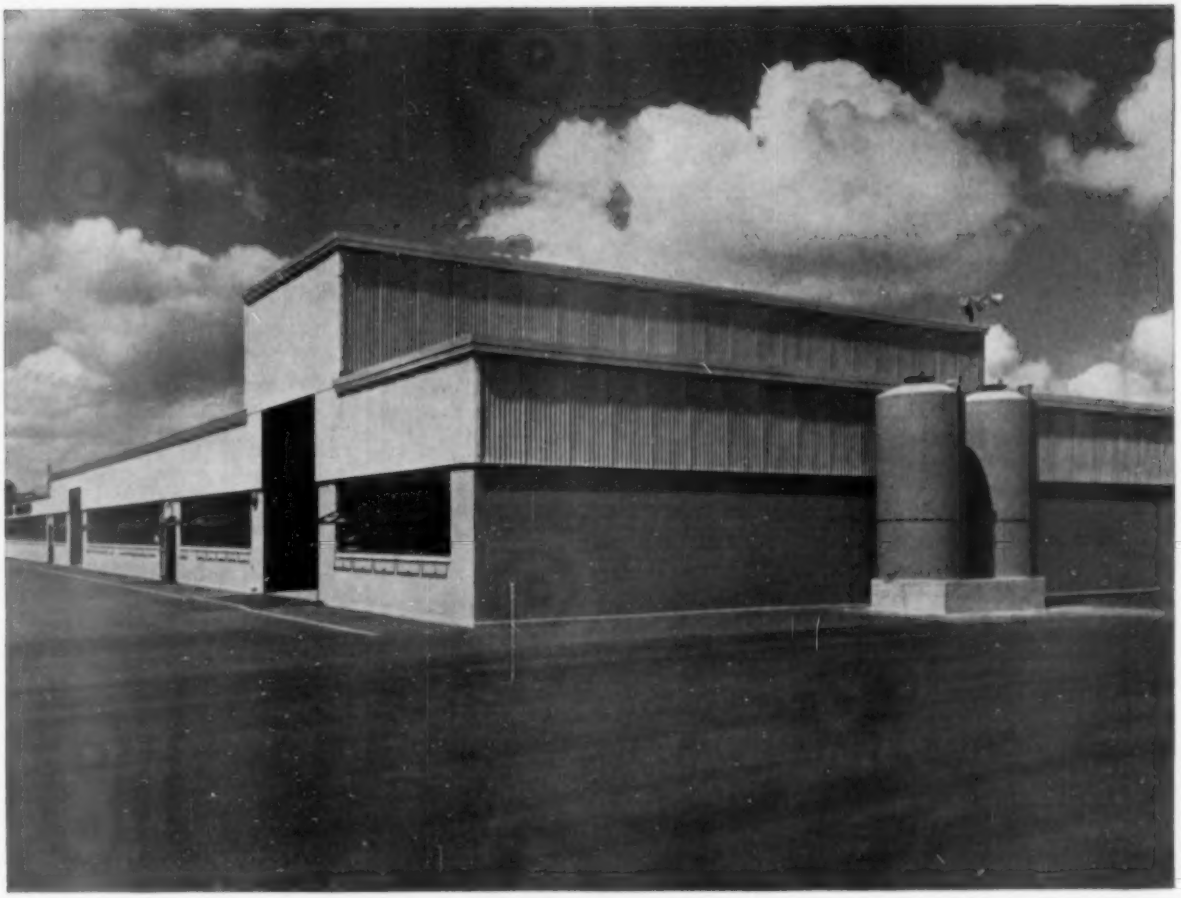
A new principle of power assembly mounting is introduced in this new Jenn-Air Exhauster. U-springs suspend the power unit so it is cushioned against vibration . . . an exclusive Jenn-Air feature. New design in fan blade and housing reduces air velocity. In addition to the usual dynamic and static blade balance, a further critical test is made . . . the motor and blade are balanced together . . . another Jenn-Air exclusive. *All this adds up to the lowest noise level ever achieved in power exhausters.*

Every Quiet-Tested Exhauster Individually Checked by Exclusive VIBRONIC EYE

Every Quiet-Tested Unit is individually checked under simulated operating conditions by the exclusive Vibronic Eye in a sound control room. It works this way. First, a standard of acceptable quietness is established . . . then the Vibronic Eye tests every exhauster for vibration and noise. A further test is made for motor load and insulation break-down. Those are examples of the ceaseless search to improve products by Jenn-Air. So, look to Jenn-Air for better engineered exhausters—designed and line tested to perform beyond any in the field.

"Ratings in accordance with standard test code by the Texas Experiment Station"—determined in accordance with procedures as set forth by NAFM and ASH&VE.

JENN-AIR PRODUCTS CO., INC.
1102 Stadium Drive
Indianapolis 7, Indiana



K&M Corrugated Asbestos Sheets, used as siding on the Operations Center of a southeastern utility company, complement the clean, modern lines of the building. These sheets are also used on a pitched roof, not shown in the photograph. Engineering and supervision of construction: Stone and Webster Engineering Corporation. Applicator: Whatley Roofing and Sheet Metal Works, Tampa, Florida.

Attractive, weather-proof, fire-proof, maintenance-free

K&M Corrugated Asbestos

Building a new plant? Modernizing your present one? In either case, you'll gain important cost and other advantages with K&M Corrugated Asbestos-Cement Sheets. They cannot burn, can't rot or corrode—withstand the ravages of time and weather year after year. Because K&M Corrugated Asbestos-Cement Sheets rarely require maintenance, *never* need protective painting, their upkeep is held to the barest minimum.

Easy to apply. These corrugated sheets offer big savings in application costs. They go on quickly, are easily sawed, drilled, and fitted on the job.

Write for complete details on K&M Corrugated Asbestos Roofing and Siding.

KEASBEY & MATTISON
COMPANY • AMBLER • PENNSYLVANIA

K&M best in asbestos

Naugatuck's new LATICRETE

Makes Floor Surfacing that is:

- Resilient as wood
- Chemical resistant
- Slip resistant
- Long wearing
- Impervious to water
- Flexible and tough
- Quiet; non-dusting
- Non-sparking

Only a rubber latex-based concrete like LATICRETE can give you such a combination of properties and desirable advantages! Use LATICRETE for new concrete construction, for resurfacing or patching old concrete floors, (¼-inch thick), setting and pointing tile or glass bricks, lining tanks, waterproofing and finishing concrete block walls. Write for detailed folder today!

United States Rubber

Naugatuck Chemical Division

Naugatuck, Connecticut

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- Meyer Z-52 Zoysia builds a dense turf of lasting beauty,—makes your plant a community showplace.
- Cuts Maintenance costs: requires less mowing, less watering, less feeding.
- Chokes out crabgrass and summer weeds.
- Resists drought, disease, insects.
- Stays a cool, lush green under scorching summer sun.
- Developed under government-sponsored research
- Our patented root-runner shipments give you much faster coverage at much lower cost.
- Certified stock; unconditional guarantee. Air shipping charges, prepaid.
- Write Desk 40 for free illustrated information.

The Turfgrass Farm

4961 E. 22nd ST. • TUCSON, ARIZ.

A Mile of Crawford Doors (400 Doors) In

The Market Building of the St. Louis Produce Association, Inc., is one of the largest buildings of its kind in the world and one of the most modern and functional. It houses the brokerage activities of more than 65 produce commission houses which own the building cooperatively and occupy standard units which are enclosed front and rear, and separated by 400 Crawford Doors.

Five miles of railroad track behind the two buildings can accommodate more than 200 produce cars at a time. About 100 cars a day deliver 1,500 tons of produce which enters through the rear doors, is sold on the floor and is loaded through the front doors onto hundreds of trucks for local delivery. The advantages of this direct flow and minimum handling are obvious and have brought many interested marketeers to St. Louis to study this operation.

The "Market" is actually two buildings, each 1,235 feet long, 115 feet wide and 20 feet high. Each building contains 49 cooperative units, each of 25 foot frontage by 115 feet deep. Units are separated by Crawford Doors which permit units to be combined in twos, threes, etc. The building covers 20 acres, six city blocks, and provides 281,750 square feet of floor space. Construction is tilt-up concrete and was completed in October, 1952. Cost was $3,250,000.

The 400 Crawford Doors are distributed as follows: 100 doors 8'0" x 8'0" on the rear, facing on the railroad siding; 200 doors 10'0" x 10'0" on the front, facing on the truck loading docks; 100 doors 10'0" x 8'0" in the dividing walls, between units. All these doors are manually operated and are reported to be giving completely satisfactory service. If you have door problems, please write us; your inquiry will get prompt, intelligent attention. Crawford Door Company, 166-20263 Hoover Road, Detroit 5, Michigan. Plants in 10 cities; Warehouses in 94 cities; Sales and Service everywhere. In Canada, F. Fentiman & Sons Ltd., Ottawa, Ontario.

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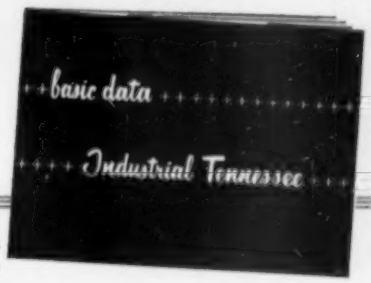

This 28-page booklet outlines, without exaggeration, the principal advantages of a state which has been designated by industrialists already located in Tennessee as "America's No. 1 Industrial Opportunity."

From the booklet you can get a clear picture of Tennessee towns and cities, markets, labor, raw materials, fuels and power, transportation, industrial capacity and diversification, living conditions, industrial tradition, recreational facilities, and the close cooperation you will obtain from Tennessee officials in choosing the exact location you need.

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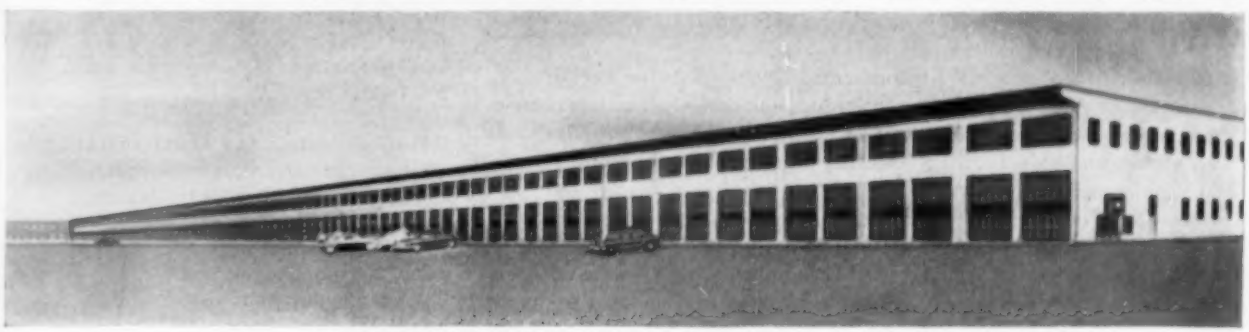

St. Louis Produce Association, Inc. Market Building

Architects: L. ROY BOWEN & ASSOCIATES, St. Louis, Mo.
Contractors: ROBINSON CONSTRUCTION CO., St. Louis, Mo.
Crawford Doors by CRAWFORD DOOR SALES CO. of St. Louis

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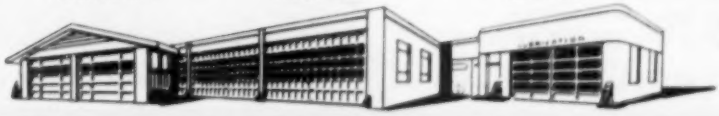

First Fiberglass Panels Labeled by Underwriters' Laboratories Inc.

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Now you can safely specify translucent fiberglass panels for such installations as skylights, partitions, windows and luminous ceilings—even when building codes call for a flame spread rating of below 75 or where fire-safety is an all-important consideration.

Fire-Snuf fiberglass panels, manufactured by the Resolite Corporation, are listed by Underwriters' Laboratories Inc., and each sheet or pane carries the Underwriters' label. Their flame spread rating of below 75 places them well within the "slow burning" category established by the Building Officials Conference of America.

Flame resistance is chemically locked into the polyester resins from which Fire-Snuf panels are manufactured. They do not support combustion. While they will burn when a hot flame (such as a blowtorch) is applied directly to the surface, they are self-extinguishing and will snuff out as soon as the source of heat and flame is removed.

Fire-Snuf panels are molded in standard building corrugations and flat sheets or panes, in lengths up to 13 feet and widths up to 42 inches. They are available in Fire-Snuf Green, a color which painstaking investigation has proved to be scientifically correct for best working conditions and optimum light diffusion.

Fire-Snuf retains all the best features of standard Resolite panels—shatterproof safety, high strength, translucence, stability and load bearing characteristics.

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struction, building, and architectural products. All are well illustrated with photos, drawings, and tables. From 4 to 32 pages each. *Aluminum Co. of America.*

20—Grating and Stair Treads. Steel, aluminum, and stainless types are described and illustrated in this bulletin. Safe load table, panel width constant chart, drawings of anchors. Includes indoor and outdoor safety treads. *Klemp Metal Grating Corp.*

21—Door Operators. Catalog 200 presents electric operators for sliding and sliding-folding doors, swinging doors, vertical lift doors, and gates, plus units for special applications. Construction features are described. Illustrated. 8 pages. *Richards-Wilcox Mfg. Co.*

22—Plastic Pipe. Here are three bulletins on three types—flexible, rigid, and sewer and drain pipe. Each contains information on applications, chemical resistance, specifications. Photos show you step-by-step installation of fittings. *Carlon Products Corp.*

23—Construction and Maintenance Products. Slim-Jim handbook covers concrete and wood floor treatments, paints and protective coatings, concrete and mortar admixtures, waterproofing and dampproofing, caulking compounds, roof coatings. 125 pages. *L. Sonneborn Sons, Inc.*

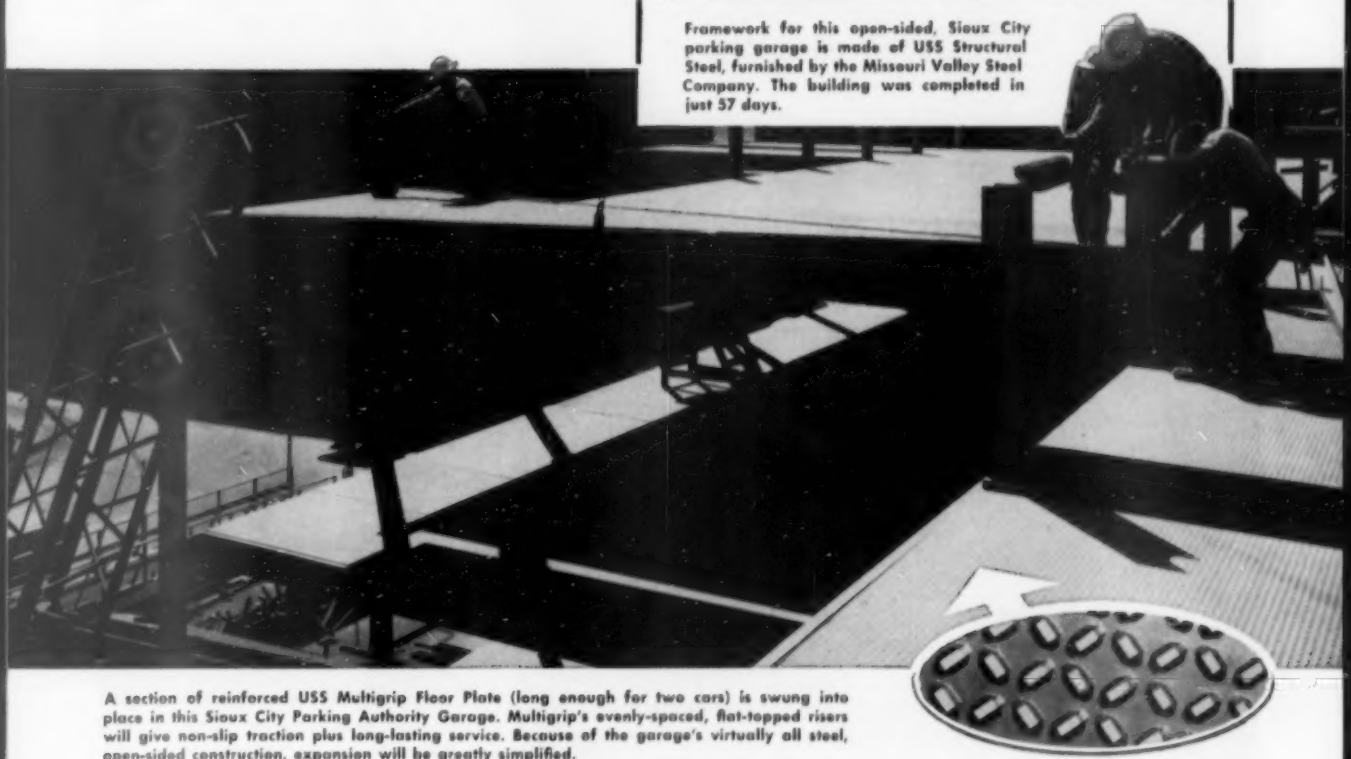
24—Permanent Steel Buildings. Bulletin BF-54 offers flexible, functional, custom-designed units of shop-fabricated components. Discusses features of basic component—deep-rib sheets for sidewalls and roofs. Shows variations of six designs. *Dresser-Ideco Co.*

25—Roofing and Siding. Bulletin on roofing and siding of cement and asbestos fiber (16 pages), plus supplements on stud weld fasteners; "Topseal," "Holegrip," and sidelap fasteners; staggered joint application. *National Gypsum Co.*

Turn the page

Sioux City cars park on 223 tons of *Multigrip* Floor Plate

Framework for this open-sided, Sioux City parking garage is made of USS Structural Steel, furnished by the Missouri Valley Steel Company. The building was completed in just 57 days.



A section of reinforced USS Multigrip Floor Plate (long enough for two cars) is swung into place in this Sioux City Parking Authority Garage. Multigrip's evenly-spaced, flat-topped risers will give non-slip traction plus long-lasting service. Because of the garage's virtually all steel, open-sided construction, expansion will be greatly simplified.

Just 57 days after delivery of materials, Sioux City drivers were parking in this four-story Sioux City Parking Authority Garage. The open-sided garage isn't complicated—but it's there to stay. Structural framework consists of rugged USS Structural Steel while the flooring is USS Multigrip Floor Plate.

There were three very good reasons for choosing Multigrip as flooring. Flat-topped, evenly-spaced risers offer non-slip traction for feet and wheels, even when the plates are wet. By attaching Multigrip to steel flooring supports, whole sections of floor could be swung into place by a crane with a minimum of trouble and preparation. And, should it become necessary to expand this garage, there will be no need for expensive alterations or redesigning. It will be as simple as erecting more framework, attaching additional Multigrip to supporting beams, and swinging another section of parking space into service.

USS Multigrip is ideal for use where floors take a severe beating or where slipping accidents must be avoided. These rugged steel plates won't chip, crack or splinter. Evenly-spaced risers offer positive traction and easy cleaning as well as drainage in *all* directions. Multigrip can be formed or bent where necessary and is available in large plates, minimizing installation waste. Where wearability and safety are important—always specify USS Multigrip Floor Plate.

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Quality...

IS A PARADOX

It is automatically guaranteed though the need of warranty has evaporated. Guarantee is of value only where serviceability is uncertain—and then it is no longer given. Raynor adherence to quality—in materials from which Raynor Doors are fashioned; in graceful strength of design; in skilled and careful manufacture; and in responsible distribution—means a product guaranteed in service. This is at once an assurance of trouble-free operation. Raynor is proud to identify their doors with an easily recognized "mark of quality".

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Begins on page B-30

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26—Steel Deck. Catalog No. D-56 describes and illustrates deck for roofs, sidewalls, partitions, ceilings, and floors. Discusses advantages and features. Specifications and illustrated instructions for installing. Closeup of details. 16 pages. *R. C. Mahon Co.*

27—Windows and Doors. Spiral-bound Bulletin 1057A covers many types of steel windows, alumium windows, and hollow metal doors. Handy thumb index to 18 informative sections. Dimension drawings aid selection and installation. 28 pages. *Ceco Steel Products Corp.*

28—Building Panels. 48-pager covers steel and aluminum "Fenestra" panels for floors, wall, roofs, and ceilings. Engineering data, section property tables, specifications, installation diagrams, information on acoustical treatment. *Detroit Steel Products Co.*

29—Bonding Agent. Here's the story on "Weld-Crete" for permanently bonding new concrete directly to old concrete, or bonding new concrete directly to brick, wood, masonite, gypsum board, concrete block, metal tile, other surfaces. Applications. *Larsen Products Corp.*

30—Windows. Two bulletins on two types: One covers "Plexiglas" glazing, a tough, resilient, outdoor plastic made in many types and sizes (16 pages). The other covers a louver panel that lets in the sunlight without glare or heat (18 pages). *Rohm & Haas Co.*

31—Cellular Floor. Here's the story on "Celluflor," which is not only a floor but provides for electrical raceways, heating and air conditioning ducts; allows for growing needs; has underside that's a ceiling. Catalog 270. 16 pages. *Inland Steel Products Co.*

32—Overhead Doors. Folder No. S-567 covers a complete line of sectional, upward-acting doors, plus electrical operators. Shows doors

MOISTURE-PROOFING ADDITIVE

for concrete and cement materials

Now you can moisture-proof your concrete products by the simple addition of a small amount of LOSORB to the mix. The photograph above shows clearly the amazing effectiveness of Losorb. The blocks are identical except for the Losorb—water was poured on both simultaneously—and the picture shows the imperviousness of the treated block.

With this treatment you can produce water-tight concrete blocks with which to build walls so impervious that they can be painted inside without danger of blistering and peeling due to passage of moisture through the concrete. Losorb materially reduces the cost of providing water-tight building exteriors, and eliminates the need for any other waterproofing above grade.

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for wood casings, steel jambs; standard units, and galvanized steel doors. Installation details. 12 pages. *Overhead Door Corp.*

33—Steel Floor Armor. Folder on heavy-duty flooring tells with photos and diagrams how to install in new concrete, over existing concrete base, over wood base. Includes a flexible type floor armor for the oil and chemical industries. *Klemp Metal Grating Corp.*

34—Pipe Fittings. Bulletin 314 covers a line of corrosion-resistant welding fittings—monel, nickel, inconel, and stainless steel types. Shows how they're made. Information on dimensional tolerances and specifications. 30 pages. *Welding Fittings Corp.*

35—Roof Insulating Coating. This folder describes "LowTemp," a highly reflective asphalt aluminum coating that you can brush or spray on any roof surface for insulating—lowers inside temperature at least 20%. Tells how it works, discusses advantages. *Everseal Mfg. Co.*

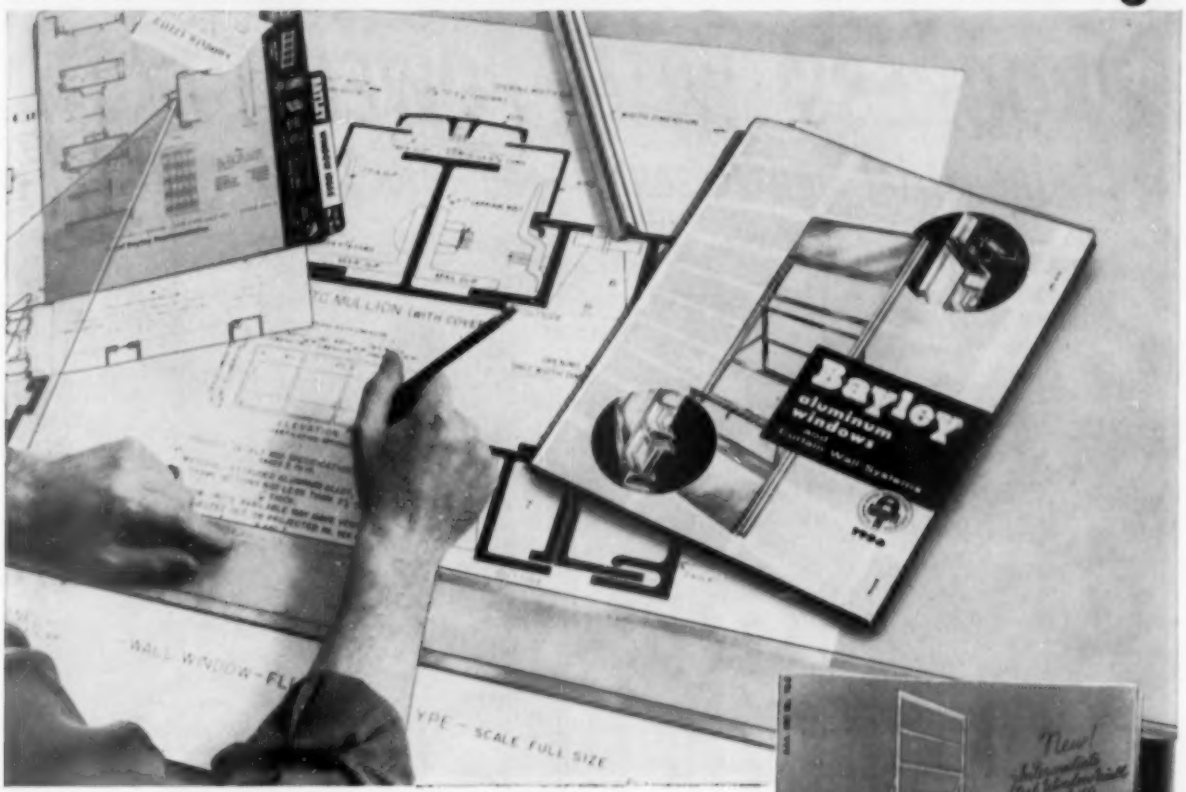
36—Metal Compartments. Catalog No. 56-T covers a complete line of toilet compartments, shower and dressing rooms, and shower units. Features a helpful guide for color planning. Drawings of typical layouts. Hardware and fittings illustrated. 20 pages. *Mills Co.*

37—Insulating Block and Cement. A one-block insulation and a finishing cement that insulates—both made of mineral wool—are described in this 8-pager. Tells how to use alone or in combination form. Data on thermal conductivity. 8 pages. *Baldwin-Hill Co.*

38—Built-Up Roofing. This 32-pager provides specifications for flat decks, smooth surface and mineral surface steep decks. Information on re-roofing, insulation, flashings, waterproofing, damp-proofing. *Koppers Co.*

Turn to page B-54

Send TODAY for these two new catalogs



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Bayley engineering thoroughness and leadership makes another contribution to advanced building designing and construction. Even "forerunning" present day trends! Now without the costliness of special window designing you can execute many of your design treatments in modern curtain-wall construction. With Bayley sub-frame design, which accommodates separate window units, standard Bayley Aluminum or Steel Projected Windows (with channel frames) of any standard size can be used—offering wide flexibility in the use of newer panel decorating materials, plus the desired window area for providing maximum air, light and vision.

Get the advantage of Bayley Engineering

These two new catalogs give full details on these important Bayley developments—as well as the plus values you get from Bayley engineering and pre-planning services when you specify Bayley. Send for your copies today.

For Sweet's reference see Bayley Aluminum Windows File 17a/Bay and Steel Windows File 17a/Ba

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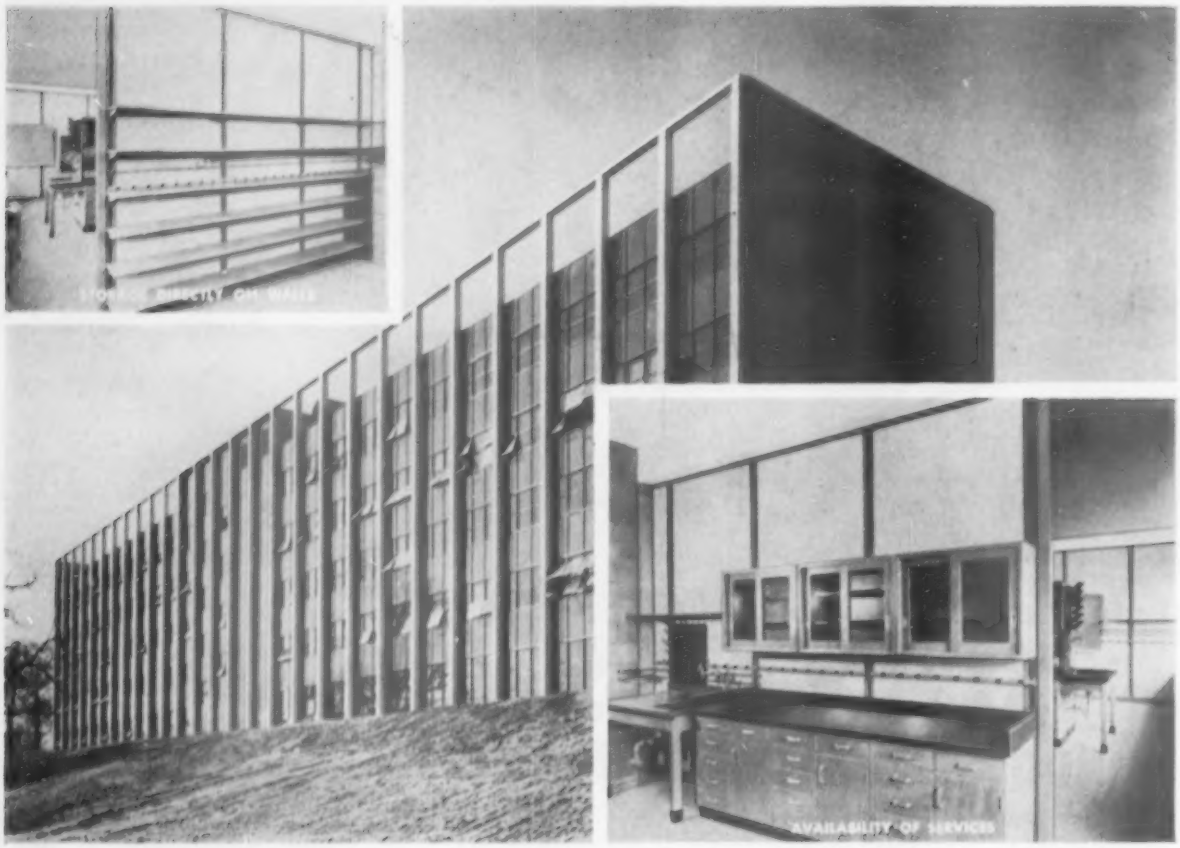

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Ask your Power-Strut Sales Engineer to demonstrate the visual sales kit or write for descriptive brochure No. 401-1.

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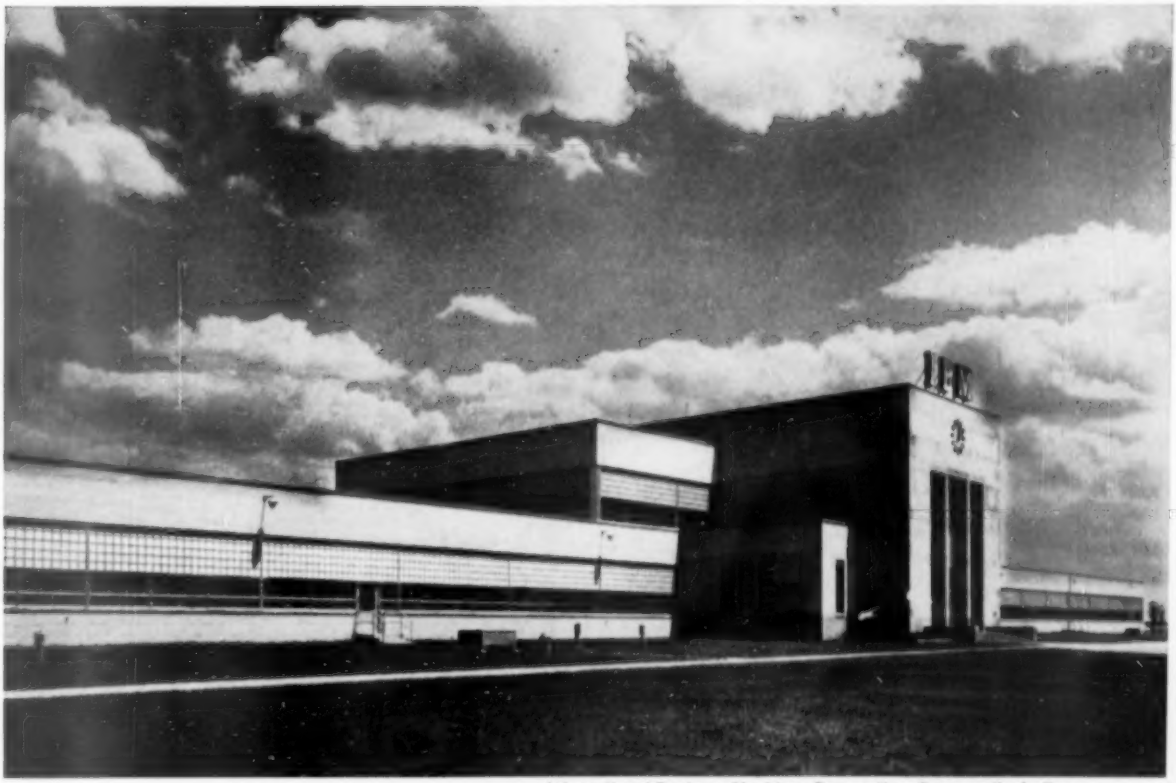


International Business Machines Corporation, Greencastle, Indiana
Engineers and Architects: Giffels & Vallet, Inc., L. Rossetti, Detroit, Michigan

IBM benefits 4 ways with PC Glass Block Panels

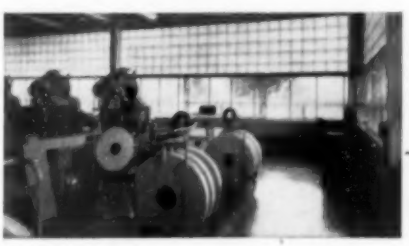
- *Controlled daylighting*
- *Reduced heating and cooling costs*
- *Elimination of sash maintenance costs*
- *Minimum washing contract costs*

IBM and its architects were well aware that the intricate production jobs handled at this plant would require plenty of daylight. But it had to be the right kind of daylight—controlled and glare-free. Insulation value of the window areas was another consideration—ordinary windows in a continuous band 8½ feet high *could* throw an excessive and costly load on the heating and air conditioning systems. And what about maintenance and washing? Costs for these items *could* jump way out of line unless steps were taken to remove the causes of these headaches.

This planning led to the use of PC *light-directing* Glass Block panels, footed by a double-glazed vision strip. The blocks, *mortared* into five-foot high panels, bring in controlled daylight that helps workers see better. Insulation value of the glass blocks (equal to that of an 8-inch masonry wall) reduces heating and cooling costs. And because there is nothing to rust or rot, the glass block panels are maintenance-free. A twice-a-year washing is all that's necessary.

For new construction or modernization, you'll find it profitable to investigate the advantages of PC Glass Blocks. For more information, see us in Sweet's, or write Pittsburgh Corning Corporation, Dept. N-46, One Gateway Center, Pittsburgh 22, Pa. In Canada: 57 Bloor Street West, Toronto, Ontario.

PC Glass Blocks mean better looks outside—better light inside.



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Johns-Manville announces

a *Flush Clip* for impaled insulation

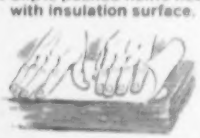
Improves appearance · **Won't tear vapor barrier** · **Safeguards personnel**

HERE'S HOW IT WORKS

1. Mechanic depresses insulation exposing tip of pin.

2. Pin is engaged by locking-holes on clip.

3. Clip is pushed home flush with insulation surface.



4. Vapor barrier (where necessary) is easily applied over clip.

Another revolutionary development introduced by Johns-Manville

Now . . . you can insure a smooth and unbroken finish on air conditioning ducts. For this new *Flush Clip*, developed and produced by the Graham Manufacturing Corporation of Royal Oak, Mich., firmly secures impaled insulation without sacrificing eye appeal or impermeability of vapor barrier.

Plant personnel will appreciate the neat, smooth appearance unbroken by ugly protuberances. The Graham® *Flush Clip* also provides an excellent surface for decorative or identification painting. Insulation engineers will be able to furnish a snugger fitting, more efficient job with an unbroken vapor barrier that is easily applied. Installation crews will find their work simplified and speeded—with no trimming and cutting required—and a greatly reduced injury hazard from sharp, jagged projections.

Johns-Manville's Industrial Contract Department has worked closely with the Graham Manufacturing Corporation in field-testing the Graham *Flush Clip* on industrial installations. Used in conjunction with the Graham Insul-Pin System, it has been proven to operate ideally with J-M Spintex Insulation, plain and faced. For more information and samples, contact your nearest J-M Insulation Contractor. Or write Johns-Manville, Box 60, New York 16, New York. In Canada, Port Credit, Ontario.

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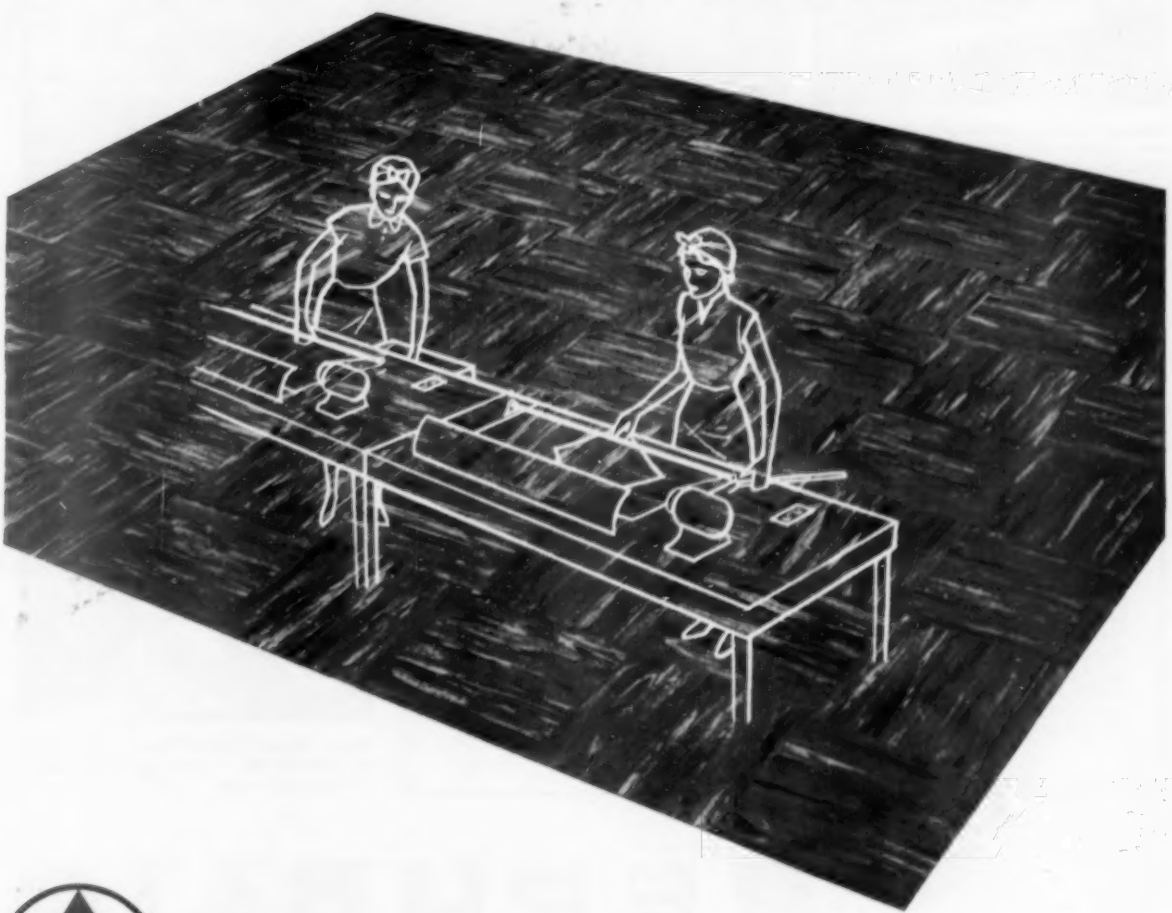
Improves Worker Efficiency

Vina-Lux vinyl-asbestos tile has a cushioned resilience that's kind to feet and legs – guards against lowered output at the end of the shift. It's safer, too, because the surface has a foot-sure, slip-safe quality. Vina-Lux will take all kinds of abrasive wear – it's a tough grease-proof floor that withstands in-plant trucking. It's the easiest floor on the market to clean and keep clean. It's the floor that will pay you dividends in better production, happier employees, lower costs. Why not let a qualified representative call and tell you how Vina-Lux can cut down *your* flooring costs?



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Michigan Bell Telephone Company, Port Huron, Mich. Smith, Hinchman and Grylls, Inc., architects. E. J. Kahmann Co., contractor.

Fram Office Building, East Providence, Rhode Island. The Architects Collaborative, architects. Gilbane Building Co., contractors.

School and Convent, Church of the Holy Cross, Bronx, N. Y. York and Sawyer, architects. James King and Son, Inc., contractor.

Clemson Barracks, Clemson College, South Carolina. Lyles, Bissett, Carlisle and Wolff, architects. Daniel Construction Co., contractors.

Animal Science Building, University of Arkansas, Fayetteville, Ark. Ginocchio, Cromwell & Associates, architects. Harmon Construction Co., contractor.

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WHEREVER HE LOOKS, there's an exclusive feature on Republic "Inch-Marked"® E.M.T. that helps cut costs, makes installations easier. The "Inch-Marking" feature eliminates measuring. The "Guide-Line" helps prevent costly "waws." And inside knurling simplifies wire pulling. Protect your wiring circuits against fire, moisture and mechanical injury by specifying safe Republic ELECTRUNITE® E.M.T.

WHEREVER THEY LOOK, occupants of this locker room will see handsome, efficient Republic Steel Lockers. Republic's Berger Division, the world's biggest manufacturer of lockers, makes all types and sizes—with the locking system of your choice. Take advantage of Berger's worth-while and complete planning and installation service.

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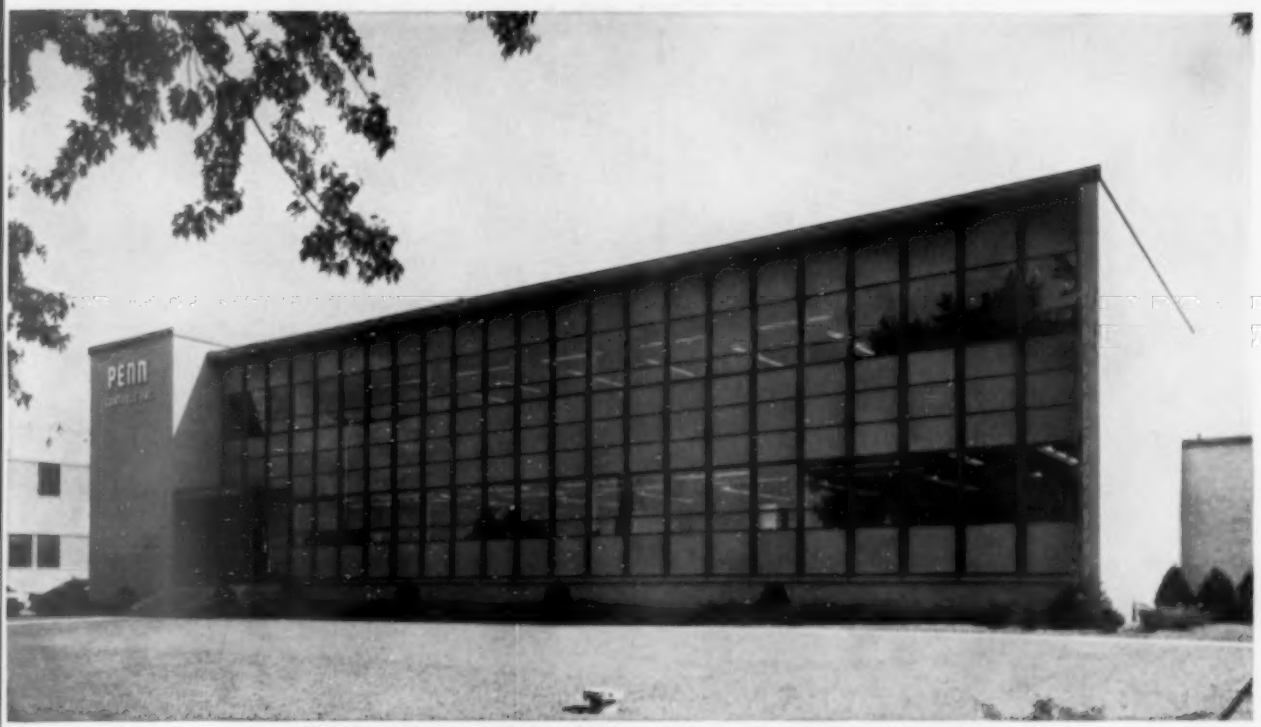

Penn Controls Engineering Building, Goshen, Ind. The Austin Co., architects and contractor.

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Truscon's Wall With a Window

Hundreds of new buildings have been designed around the Vision-Vent idea since this revolutionary new wall panel was introduced a scant thirty months ago. Hundreds more installations are on the boards now.

Why such enthusiastic acceptance? Here's a building method that gives you all the mass-production and installation economies of standard steel windows. Vision-Vent combines window and wall panel in one integrated unit which is easily installed as a unit. It encloses entire walls, can be erected from inside regardless of weather.

Each Vision-Vent unit is complete with fixed lights, awning-type ventilators, insulated steel panels. A Vision-Vent variation includes Truscon Double-Hung Steel Windows in place of awning-type ventilators.

Insulated panels are in colored porcelain enamel or in stainless steel. They have an insulating value equal to that of an ordinary masonry spandrel wall. They retain interior heat; they provide for efficient air conditioning. Minimum wall thickness—less than 1½"—provides extra square feet of floor space. Light weight of Vision-Vent walls is reflected in structural savings.

This exciting Truscon development is recommended for use in all types of single and multi-story buildings. Truscon window engineers will be glad to study your requirements and develop design details and costs. More specs in Sweet's, or send coupon for facts.

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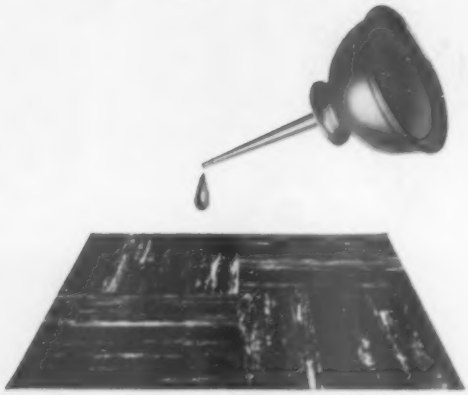

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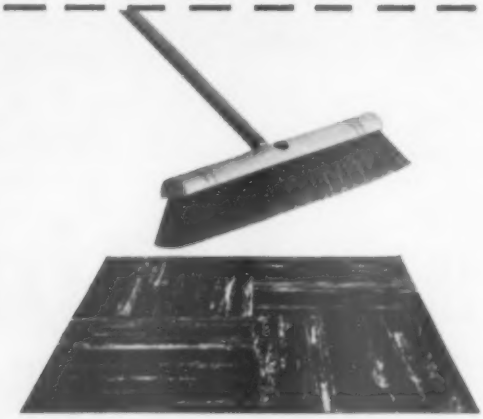
GREASEPROOF

IF IT HAS TO TAKE
PUNISHMENT



IF IT HAS TO BE
EASY-TO-MAINTAIN

IT HAS TO BE SPECIAL KENTILE

Where traffic is heaviest and constant exposure to industrial oils and greases is a definite hazard to ordinary flooring, *Special (Greaseproof) Kentile* is the answer.

Besides offering remarkable resistance to punishing foot and wheel traffic, *Special Kentile* is not harmed by oils or greases, and resists most chemicals, adhesives, inks, and alcohols. It requires minimum maintenance care; is comfortable underfoot and fire resistant.

In addition to its low maintenance expense and low installation cost *Special Kentile* comes in a range of colors that allow modern factories to design "Safety Color" areas in floors to add another safety feature to their employees' welfare. You'll want to discuss all these facts about *Special Kentile* with your Kentile, Inc. Flooring Contractor. Why not see him today, or write Kentile, Inc., 58 2nd Avenue, Brooklyn 15, N. Y.

SPECIAL KENTILE®

FLOORS FOR INDUSTRY

®REG. U.S. PAT. OFF.

KENTILE • KENCORK • KENRUBBER • KENFLEX • KENFLOR • KENROYAL

outlasts ordinary plastic skylights... SIX-TO-ONE!

NEW *Granitized*® Corrulux®

Proven conclusively with accelerated erosion tests conducted by independent laboratories!

Surface erosion by wind, dust and sleet reduces light transmission of ordinary plastic skylights by as much as 50% in 2 to 3 years. Now . . . **new** *Granitized* CORRULUX with super-erosion-resistance, tested against competitive panels, gives up to six times longer service life . . . lasting beauty and light transmission.

Don't buy **any** plastic panel until you have checked new *Granitized* CORRULUX. Flat or corrugated, shatterproof! Three skylighting colors for your choice of light transmission.

See your local distributor or write

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Corrulux® DIVISION

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*Trade Mark

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Businessmen of Lakeland, Florida will cooperate fully and furnish complete information to manufacturers who will consider relocating or establishing a branch unit in this fast growing central Florida city.

Lower operating costs are possible in Lakeland for many reasons. Friendly labor, unusual tax advantages, and low building costs are especially attractive to small or medium industries.

In the past few years, Florida has become a major consumer and is still growing rapidly. Lakeland is located almost exactly in the center of this new market.

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Industrial
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HUB OF FLORIDA'S FASTEST GROWING INDUSTRIAL AREA

GRATING
Open steel flooring; welded or riveted pattern; fabricated in carbon or stainless steel, aluminum, monel and alloys
when you specify KLEMP You Eliminate Maintenance Costs and Assure Worker Safety!
HEXTEEL
A steel floor armor designed to prolong the life of floors 5 times! Installed in concrete or mastic on new or existing concrete or wood floors
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FACTORY / CATALOG NEWS
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To get these catalogs, circle item numbers on the Reader Service card next to back cover.

39—Overhead Doors. Standard panel, carved panel, pass doors, and doors with flush sections are shown in 12-page Form 6002. Data on standard features, reinforcement, special lifting devices, special locking devices. Drawings of framing details. *Raynor Mfg. Co.*

40—Metal Lath. Manual lists advantages and properties of this construction. Covers types, channels, suspended ceilings, fireproofing. Includes Milcor partitions, building accessories, lathing accessories. Catalog 202. 16 pages. *Inland Steel Products Co.*

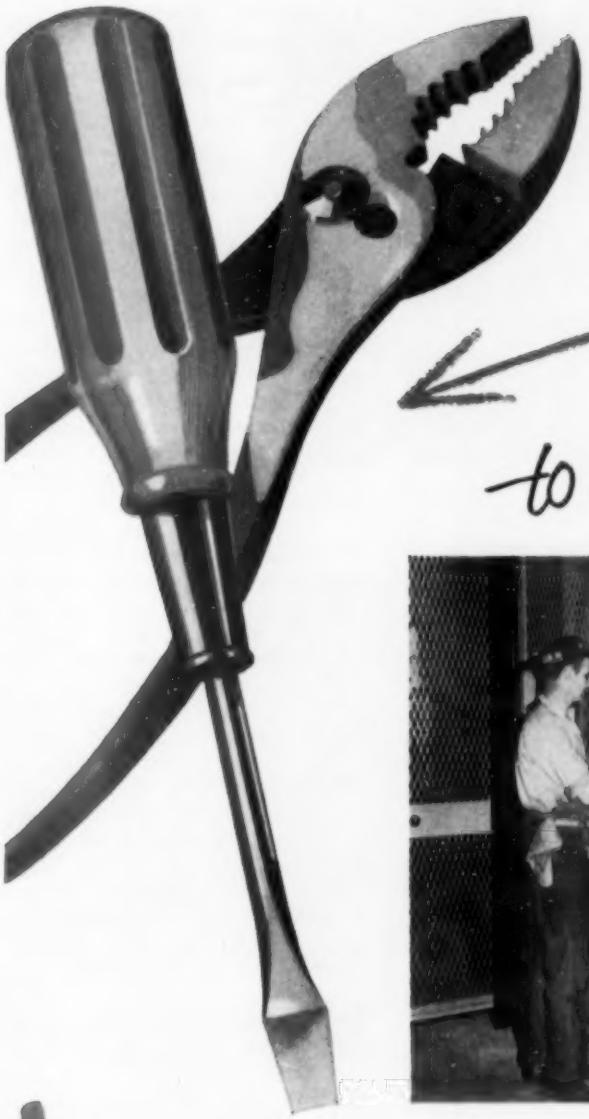
41—Construction and Maintenance Products. Quick reference guide lists products for roofs, floors, masonry preservation, sash interior painting, special painting; miscellaneous aids. Discusses methods of keeping buildings in good condition. 20 pages. *Tremco Mfg. Co.*

42—Fastening System. This booklet will tell you how to fasten construction materials to steel or concrete faster, with less cost and fatigue, with a powder-actuated tool. Shows a wide selection of fasteners. Includes guards. 8 pages. *Ramset Fasteners, Inc.*

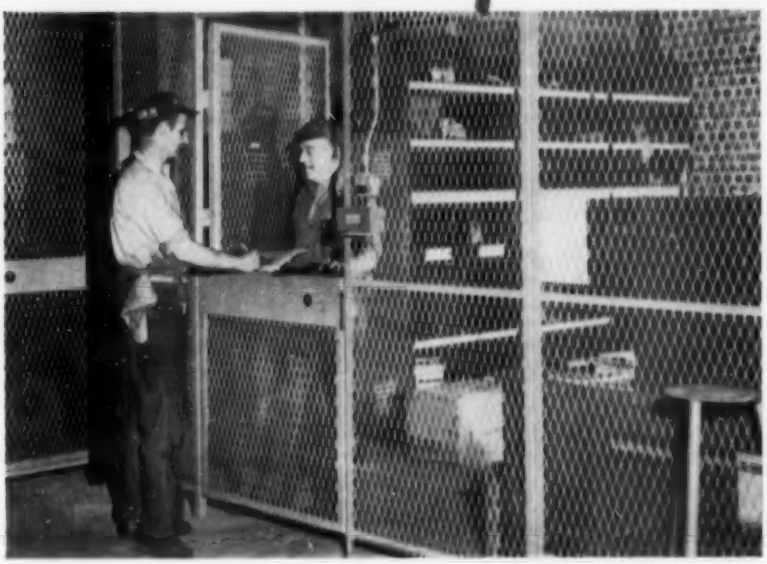
43—Pressure - Treated Lumber. Booklet tells, with the aid of case histories, how "Wolmanized" lumber (which has characteristics of alloyed material) withstands process moisture, condensation, concrete and masonry contact, and other exposures. 16 pages. *Koppers Co.*

44—Steel Products. Three bulletins are offered (12, 8, and 12 pages) on steel joists and roof deck, metal lath and accessories. All contain installation drawings, application photos, and engineering tables. Nos. 5004E, 4001J, 3001K. *Ceco Steel Products Corp.*

45—Masonry. This 26-page booklet will tell you how to build better masonry with maker's mortar cement. Sections on characteristics;



all you need are THESE... to install THIS!



WHEELING ExM STANDARD PARTITION PANELS

Imagine building a tool room, storeroom or enclosure, making it fit any floor plan no matter how complex, without cutting, drilling or welding ... and installing it with only the help of a screw driver and pliers. That's Wheeling Expanded Metal Standard Partition Panels.

What's more, all panels and doors are interchangeable so it's always possible to enlarge, change, vary or make small enclosures.

Wheeling ExM Partition Panels are shipped complete with all necessary corner angles, brace-bars, fittings and bolts. A wide variety of gauges and mesh dimensions is available. Write today for details.

P.S. Wheeling also manufactures Expanded Metal in a variety of heavy gauges for use in reinforcing concrete and building construction. Also a full line of Wheeling Metal Lath and Accessories.

WHEELING CORRUGATING COMPANY

Wheeling, West Virginia

Warehouses: Boston, Buffalo, Chicago, Columbus, Detroit, Kansas City, Louisville, Minneapolis, New Orleans, New York, Philadelphia, Richmond, St. Louis. **Sales Offices:** Atlanta, Houston

Almost *Overnight*...get flooring that's durable...comfortable...tough ...with FLINTMASTIC!

Resurface your worn work floors. Fast.

In a matter of hours... plant traffic will be moving quickly, smoothly, over an efficient Flintmastic† cold-laid asphalt mastic floor! You'll have an entirely *new* wearing surface.

If you just want to *repair* holes or smooth over damaged areas... Flintmastic, which is asphalt mastic made with famous Flintkote Flooring Emulsions, does *these* jobs quickly and economically, too.

Want to lay down a resilient leveling course as underlayment for decorative floor coverings? Flintmastic fills the bill again.

Remember this about Flintmastic. It is made with Flintkote *clay-type* asphalt flooring emulsion. Flintmastic floors carry the heaviest traffic without rutting or cracking. And these floors are quiet. Comfortable under foot. Shock-absorbing. Non-slip. Water-resistant. Fire-resistant.

Flintmastic specification mixes can be applied over new or old floors. In thin or thick section.

We will be glad to send you complete information and specifications for installation.

† A Trade Mark of The Flintkote Company

FLINTKOTE

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In Toronto, Ontario: The Flintkote Company of Canada, Ltd.
In London, England: Industrial Asphalts Company, Ltd.

FACTORY / CATALOG NEWS
Begins on page B-30

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workmanship; use for stucco, tile setting, glass block; specifications; typical jobs; tables. *Universal Atlas Cement Co.*

46—Steel Windows. Booklet describes maker's hot-dip galvanizing process for producing maintenance-free "Fenestra" windows, describes and illustrates projected, pivoted, security, and continuous windows, plus mechanical operators. Specs. *Detroit Steel Products Co.*

47—Coatings. Featured in this 8-pager are rust preventive, moisture seal, vapor seal, and insulating products for protecting steel buildings and equipment, masonry and insulation. Includes "Poly-Cell," a sprayed foam insulation. *Insul-Mastic Corp. of America.*

48—Paints. Subject of this 24-page booklet is Parlon-based paints, ideal as concrete and metal finishes, since they're unaffected by acids, alkalis, salts, moisture, fungus growths. Photos of applications outdoors and indoors. "How-to-paint" section. *Hercules Powder Co.*

49—Partition Systems. Catalog No. 222 covers studless, channel stud, steel stud, furring, and hollow wall systems. Describes and illustrates 12 "Milcor" components used in these systems. Installation and construction details. 16 pages. *Inland Steel Products Co.*

50—Hard Mastic Flooring. Folder tells what it is, what it does, where it's used, and how it's used. Describes 17 advantages over six other types of flooring. Provides figures on the cost of installing. Photos show you how to install it. *Permaflex Products Co.*

51—Suspended Ceilings. Catalog NSP-7 tells how to construct with "Nailock," a universal nailing channel, "Screwlock," a metal furring channel, and "Perf-A-Best," for application of asbestos board. 8 pages. *Sanymetal Products Co.*

Turn the page

STAINLESS CURTAIN WALLS

give you the best "long pull" investment

"INFO" for Architects and Builders

1. "AL Stainless Steels for Building"—12 pages on stainless grades, properties, forms, finishes, standard "specs," uses and advantages.
2. "Stainless Steels for Store Fronts and Building Entrances"—40 pages of valuable data on examples and details. AIA File No. 26D.
3. "Stainless Steel Curtain Walls"—A 24-page progress report on methods. AIA File No. 15-H-1.

Write for Details

Address Dept. F-76

Curtain wall panels faced with AL Stainless Steel have *all* the advantages. They can give your building the truly modern look. They have a soft, highly attractive luster and permit wide latitude in design for individual appearance. They're light and strong . . . can be used for sheathing or "face-lifting" operations on existing structures, as well as for any type or size of new commercial building or institution.

Compared to brick or masonry construction, stainless curtain walls present savings at every turn: in lighter foundations; in enlarged floor space; in fast all-weather erection; in reduced maintenance, easy cleaning and freedom from painting. And—*compared to any other curtain wall facing material*—stainless steel is the hardest, strongest and most resistant to smoke, fumes, weather, wear, etc. It is the one material that can best take a beating . . . that costs the least in the long run because it lasts the longest.

Our Engineering and Research Staffs, etc., are at your service—anywhere, anytime. ● Let us work with you. *Allegheny Ludlum Steel Corporation, Oliver Bldg., Pittsburgh 22, Pa.*

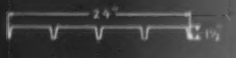
Make it BETTER-and LONGER LASTING-with

AL Stainless Steel

AL ALLEGHENY LUDLUM

WAD 82000 **Warehouse stocks carried by all Ryerson Steel plants**

NOW . . . three different types of Milcor Steel Roof Decks



New "A" Section

The standard of the industry for closed rib decks now redesigned to full 24" width.

New "B" Section

Wide rib distributes metal for greater structural efficiency — gives higher section properties per pound of steel.

New "C" Section

Carries normal roof loads over spans up to 20 feet! Offers freedom of design.

INLAND

Never before— a roof deck finish like this!

NOW — Bonderized base with baked enamel on Milcor Steel Roof Deck — a roof deck prime coat that can really take construction abuse.

Here is important news to everyone building for industry. It is the full and complete answer to problems which have long been evident to architects and builders — problems arising from the punishment taken by roof deck in shipping, handling, hoisting and use as a platform by tradesmen.

Milcor Steel Roof Deck is the only one in the field with this new, exclusive, far superior primer.

Bonderizing and baked enamel combine to produce the new glossy grey finish. The Bonderizing treatment defies corrosion, anchors paint to the metal, protects it against scuffs and scratches. The abrasion-resistant enamel is *baked on* over the Bonderized steel. The result is the finest, most durable finish ever applied to steel roof deck — and there is no increase in price!

Milcor Steel Roof Deck with the new primer is described in detail in literature just off the press. Send for your copy.

MILCOR® Steel Roof Deck

The steel panel at left was treated with Bonderite; the one at the right was not. Both panels were given a coat of Inland Epoxy Resin primer. After an "X" was intentionally scratched on them, the panels were subjected to the A.S.T.M. standard salt spray test for the same length of time. Note that in the finish over Bonderite, rust stopped at the scratch mark while it spread extensively over the plain steel panel.

INLAND STEEL PRODUCTS COMPANY
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DALLAS • DETROIT • KANSAS CITY • LOS ANGELES • MILWAUKEE
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FACTORY / CATALOG NEWS

Begins on page B-30

To get these catalogs, circle item numbers on the Reader Service card next to back cover.

52—Masonry Fastenings. Pocket-size Catalog No. 69 describes and illustrates many types of anchoring and drilling devices. Includes expansion shields, bolt shields, expansion anchors, spiral-drive nail anchor, toggle bolts; many more. 32 pages. *Arro Expansion Bolt Co.*

53—Masonry Water Repellents. Bulletin describes silicone water repellents for above-grade masonry that eliminate water seepage, prevent efflorescence, retard weathering and spalling. Discusses twelve important advantages. Form 8370A. *Union Carbide and Carbon Corp.*

54—Corrosion-Resistant Coatings. Bulletin No. 100 contains general data on ten types of four classes of corrosive conditions. Information on estimated life of corrosion service, material cost, surface on which used. Helpful primer data and coverage chart. *Carboline Co.*

55—Asphalt Products. Three booklets: One lists products for water-dampness-corrosion-protection. Second covers floor and wall products. Third, floorings, tile cements, coatings, sealers, insulation, binders, floor surfacing. *Flintkote Co.*

56—Concrete Floors. Booklet discusses the absorption process (key to hardness and density), materials, and manpower that go into these floors. Illustrates 10-step procedure for installing. Resurfacing data. 26 pages. *Kalman Floor Co.*

57—Exterior Coating. Folder describes Hydrocide Colorcoat, a textured protector many times thicker than paint. Suggest for brick, masonry, cement block, cast stone, asbestos shingles. Textured color samples. *L. Sonneborn Sons, Inc.*

58—Roofs. "Solving Roof Problems" contains valuable information on roof bases, laying a built-up roof, various types of rooms, diagnosing and repairing roof conditions, when to discard built-up roofs. Illustrated. *Tremco Mfg. Co.*

Plant workers prefer the resilience of Kreolite Wood Block Floors that cushion feet and eliminate needless fatigue.

Maintenance engineers appreciate Kreolite's durability, its dust-free, skid-proof, spark-proof safety features.

Production Supervisors are enthusiastic Kreolite boosters; they like the added production efficiency made possible by resilient flooring.

Treasurers endorse Kreolite Wood Block Flooring because of its long life and low maintenance costs . . . it's the proven economy floor.

Presidents favor these floors for overall performance. The combination of extra features give Kreolite their unanimous vote of approval.

KREOLITE FLOORS ARE FAVORED BY ALL PLANT PERSONNEL

A Jennison-Wright Flooring Expert will call at your request to make recommendations

SPECIFY KREOLITE . . . *Hundreds of millions of square feet used by leading industries since 1911.*

1 Comfortable to work over . . . easy under foot
2 Durable . . . Withstands heavy abuse.
3 Resilient . . . protects dropped tools and parts
4 Quick to install . . . can be used immediately.
5 Assures firm foundation for machines.
6 Easy to replace . . . in sections or by units.
7 Affords low maintenance cost, ½ of 1% in 20 years.
8 Offers low tractive resistance . . . easy to truck over.
9 Dustless . . . protects bearings and finished product.
10 Absorbs noise.
11 Lessens vibration.
12 Insulates against heat and cold.
13 Spark-proof, skid-proof, safe . . . with "Kreolite Jennite" Filler.
14 Easy to provide for conduits or cables.
15 Eliminates glare from reflected light . . . decreases eye strain.

THE JENNISON-WRIGHT CORP., TOLEDO 9, OHIO

KREOLITE WOOD BLOCK FLOORS

ALSO "KREOLITE" RAILROAD CROSS & SWITCH TIES • INDUSTRIAL TRACK TIES • COAL TAR PRODUCTS • BRIDGE & DOCK LUMBER

BETTER ELEVATORING IS

FREIGHT ELEVATORS for loads ranging from 40,000 pounds down to 1,500 pounds.
Booklet B-705 describes Otis Heavy Duty Freight Elevators.
Booklet B-720 describes Otis Self-Supporting Light Duty Freight Elevators.
Booklet A-414 describes Otis Plunger Electric Freight Elevators.
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ELECTRIC DUMBWAITERS for loads up to 500 pounds at speeds of 50 to 300 f.p.m.
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We'll be glad to send you any or all of the above booklets.

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DUMBWAITERS • LIGHT, GENERAL, AND HEAVY DUTY

OTIS ELEVATOR COMPANY • 260 ELEVENTH AVENUE • NEW YORK 1, N.Y.

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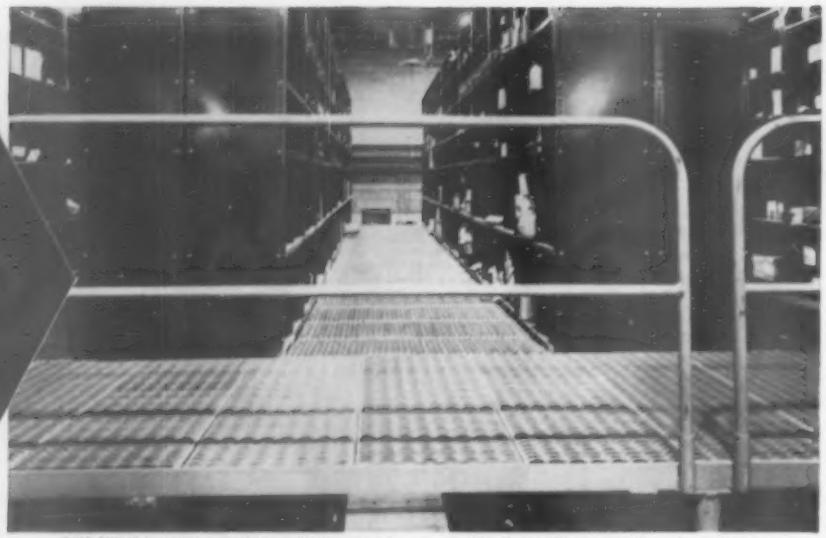
VOLUME 114, NUMBER 4 • APRIL 1956

USE THE FREE AIR ABOVE



GRIP-STRUT Installation of Balcony Walkways at Base Supply Warehouse, Chanute Air Force Base, Illinois

TO ENLARGE YOUR PLANT AND STORAGE AREAS WITH...

Balcony of GRIP-STRUT used to store body patterns, Body Div. Pontiac Motor Car Co., Pontiac, Mich.

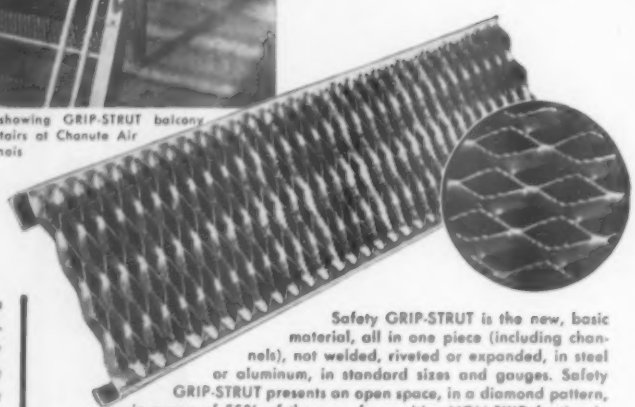
Another view showing GRIP-STRUT balcony walkways and stairs at Chanute Air Force Base, Illinois

EASY-TO-ERECT ECONOMICAL GRIP-STRUT BALCONIES

Now you don't have to extend walls to get more plant or storage room. Just use the air above your present areas to get more space with GRIP-STRUT balconies.

BIG ECONOMY FEATURES: No extra light needed below—no extra heat. No additional supports necessary because channels are an integral part of the material. No secondary sprinkler heads needed. Self cleaning. GRIP-STRUT can be cut and installed like lumber by your own maintenance force. Extremely economical—low in original cost.

IMPORTANT SAFETY FEATURES: Fire proof, slip proof, maximum strength with minimum weight. Easy to stand on, cool in summer, warm in winter.



Safety GRIP-STRUT is the new, basic material, all in one piece (including channels), not welded, riveted or expanded, in steel or aluminum, in standard sizes and gauges. Safety GRIP-STRUT presents an open space, in a diamond pattern, in excess of 55% of the area for positive NON-SKID footing in all directions. Ideal for work platforms, stair and ladder steps, flooring, balconies, catwalks, machinery guards, fire escapes and for original equipment safety treads. Write for new catalog today.

Distributors in all principal cities.
Consult yellow pages in phone book under "GRATING"

GRIP-STRUT

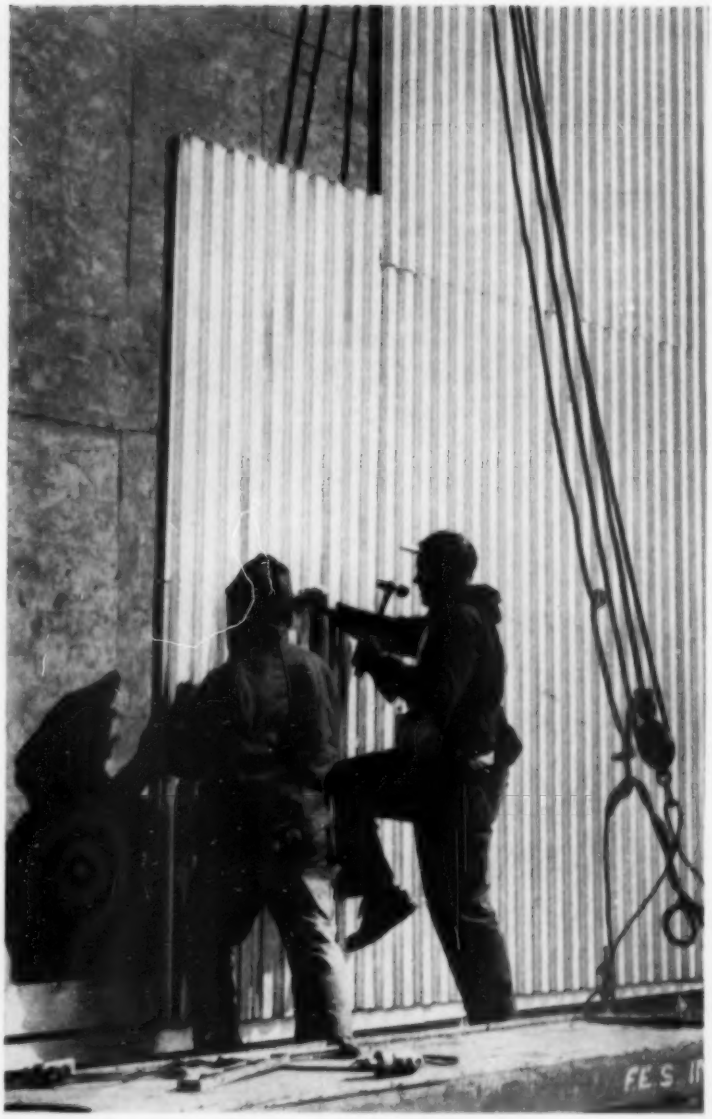
The **GLOBE** *Company*

GRIP-STRUT DIVISION

MANUFACTURERS SINCE 1914

4014 S. PRINCETON AVE. • CHICAGO 9, ILLINOIS

New sandwich wall goes up faster and the cost is low!



Here's a high-performance low-cost wall you'll want to know more about. It's the new Fiberglas* insulated aluminum curtain wall, a joint development of the aluminum industry, Nelson Stud Welding Co. and Owens-Corning Fiberglas.

This new wall is made by sandwiching Fiberglas Insulation between two sheets of aluminum. It's quickly assembled on the site, costs only about $1.10 to $1.40 per square foot, and offers other advantages, besides . . .

THERMAL EFFICIENCY—The core of Fiberglas Insulation reduces air conditioning and heating requirements. Insulating efficiency (.15 "U" Factor) is three times the value of an 8" masonry wall.

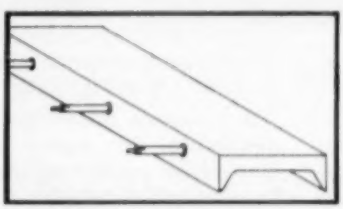
MAINTENANCE—Little or none is required. Both the aluminum sheathing and the Fiberglas Insulation are rust-proof, rot-proof, fire-safe and dimensionally stable.

DESIGN FLEXIBILITY—Standard Fiberglas PF Insulation and standard aluminum sheets are used. You get a custom-tailored building without paying for custom-tailored materials.

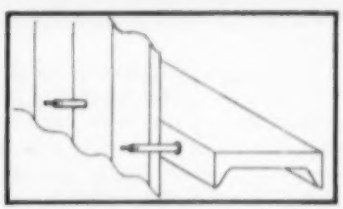
Advantages like these make the Fiberglas insulated aluminum curtain wall perfectly suited for commercial and industrial buildings—for plants and warehouses of all types. For full details on this high-performance, low-cost wall, write today to Owens-Corning Fiberglas Corp., Dept. 85-D, Toledo 1, Ohio.

OWENS-CORNING
FIBERGLAS

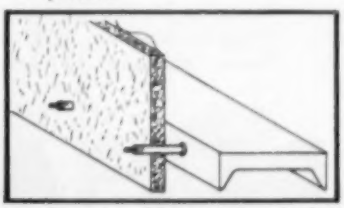
*T.M. Reg. O-CF Corp.



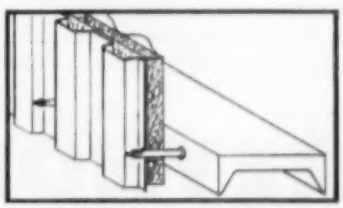
1 Nelson Rivweld Studs are automatically end welded to girts and purlins.



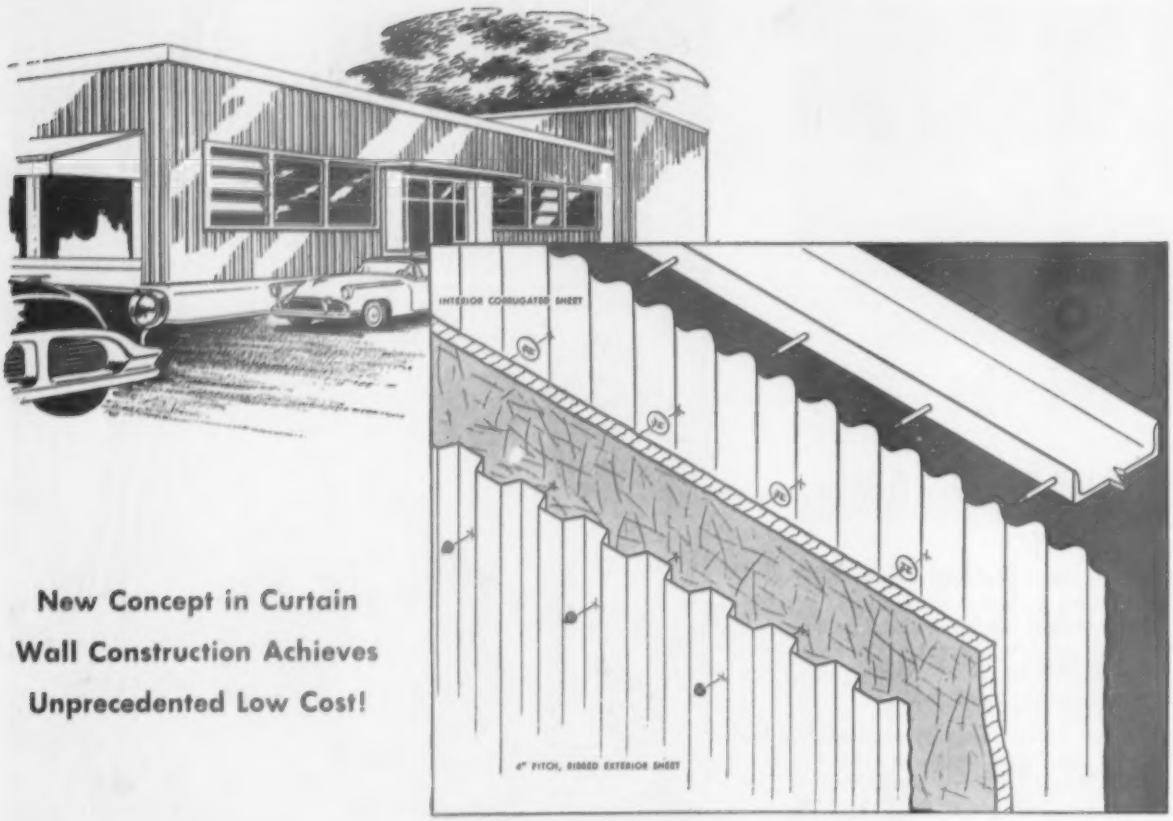
2 Interior corrugated aluminum sheet is impaled over major diameter of stud.



3 Fiberglas PF Insulation is impaled over stud extension and nested firmly against interior sheet.



4 Exterior aluminum sheet is impaled over stud extension and riveted in usual manner.



New Concept in Curtain Wall Construction Achieves Unprecedented Low Cost!

Reyconowall

Field-Assembled Insulated Curtain Wall System

Soundly engineered to combine high thermal efficiency, economical installation and freedom from maintenance, *Reyconowall* widens the horizons of industrial and commercial wall construction.

The high insulation value of *Reyconowall* (U factor as low as .155) is guaranteed by sandwich construction that combines heat-reflective aluminum .032" sheet inside and outside, plus 1" of 6# density glass fiber board. The low material cost and simplicity of field assembly bring installed cost to a new low. The rustproof and corrosion-resistant aluminum on both sides virtually eliminates painting, maintenance.

Exterior ribbed-embossed sheets 40" wide and up to 22' 5" in length eliminate horizontal joints on buildings with eave height up to 22'. Interior corrugated sheets are attractive and offer good light reflectivity. Choice of exterior treatments affords design flexibility. Write for data book.

A complete installation service is available. For name of nearest franchised jobber-erector, call the Reynolds office listed under "Building Materials" in classified phone books of principal cities. Or write to Reynolds Metals Company, Building Products Division, 2007 South Ninth Street, Louisville 1, Kentucky.

Specifications:

Exterior, .032" aluminum ribbed-embossed in 4" rib or 8" rib; or industrial corrugated*

Interior, .032" industrial corrugated*

Over-all panel thickness, 2⅞".

Weight, per square foot, 1.57 to 1.63 lbs.

**For special requirements, .024" Intermediate Corrugated may be used as an exterior or interior skin.*

REYNOLDS ALUMINUM

BUILDING PRODUCTS

See "FRONTIER," Reynolds great dramatic series, Sundays, NBC-TV Network.

Six out of ten FACTORY Award Winners chose Barrett Roofs

Year after year, Barrett Roofs top America's top plants. So it's no surprise to find six Barrett Roofs among the 1956 winners of FACTORY's Significant Plant Awards.

Here's up-to-date proof of the high regard of America's leading architects and builders for Barrett Roofs. Barrett protects this 100-year-old reputation through high standards of materials manufacture . . . a nationwide network of Barrett Approved Roofers . . . and the famous Barrett Roof inspection service.

Congratulations to the 1956 winners. May future winners continue to show preference for long-lasting Barrett Roofs.

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The greatest name in roofing

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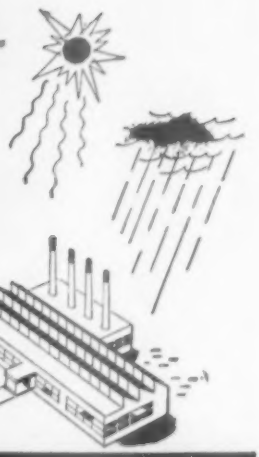
Aquadam

(slag or composition surfaced)

Built-Up Roofs*



Aquadam offers these important advantages:

- **Superior weather resistance**
- **Superior resistance to cracking**
- **Improved self-healing properties**
- **Greater kettle stability**
- **Greater adhesion—stronger bond**
- **Greater resistance to water**
- **Excellent uniformity**

J-M Aquadam proved superior by actual test... helps provide longer roof life at no extra cost

Johns-Manville Aquadam is specifically designed to provide maximum built-up roof service for deck inclines from dead level to ½″ per foot*.

J-M Aquadam Built-Up Roofs owe their proven superiority to the newly developed bituminous asphalt cementing agent Aquadam—which is used in the application of the roofing felts.

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Tests prove Aquadam's superior weather resistance!

J-M's Accelerated Weathering Test subjected samples of dead level bitumens to repeated radiation, water spray and refrigeration. Results: Aquadam has approximately twice the ability of typical asphalts to retain its initial properties on exposure.

For complete information about Aquadam Roofs, see your Approved Johns-Manville Built-Up Roofing Contractor. He's listed in the classified section of the telephone directory. Or write Johns-Manville, Box 158, New York 16, N. Y. In Canada, write 565 Lakeshore Rd. East, Port Credit, Ont.

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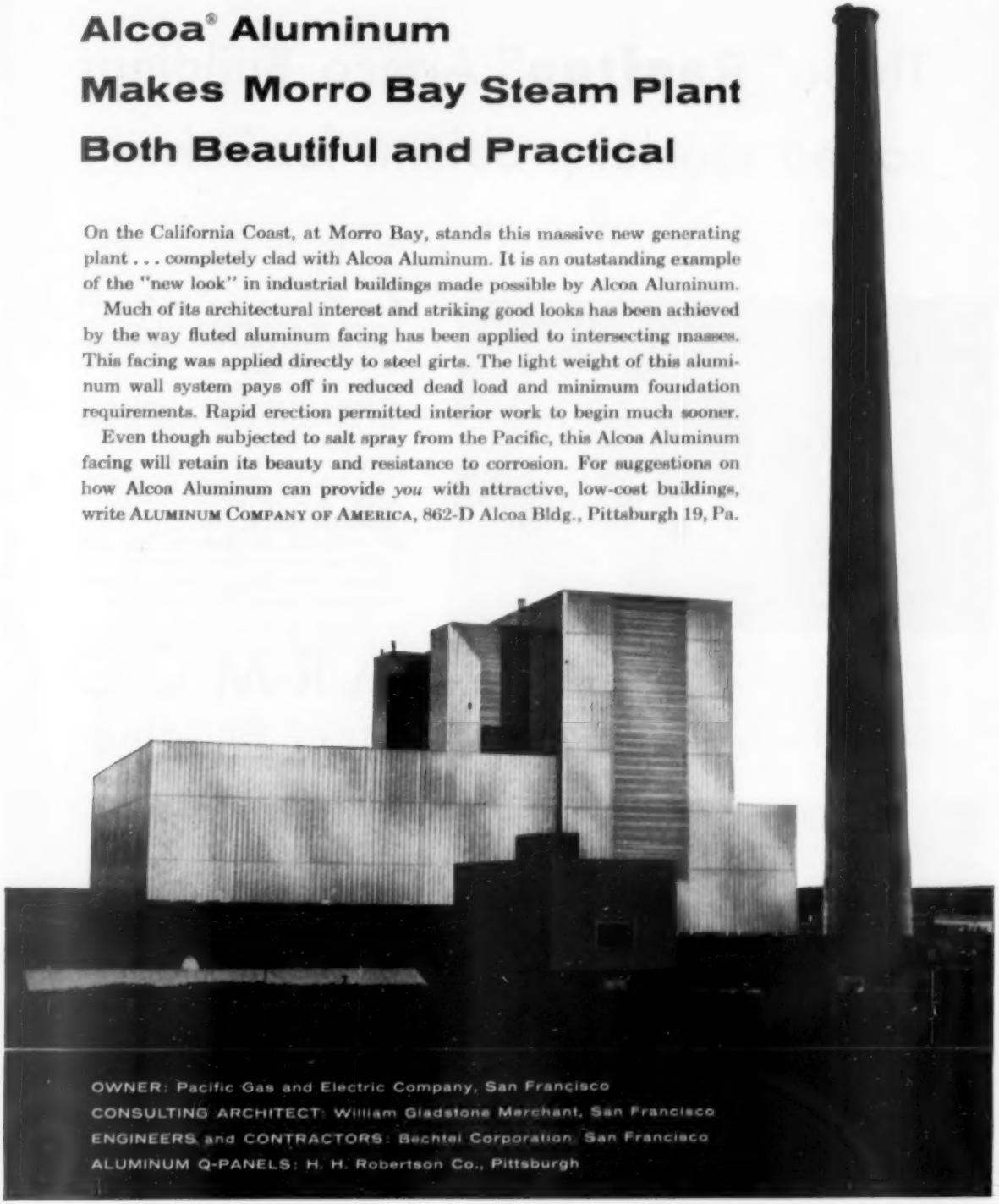
JOHNS-MANVILLE JM PRODUCTS **Johns-Manville**

Alcoa® Aluminum Makes Morro Bay Steam Plant Both Beautiful and Practical

On the California Coast, at Morro Bay, stands this massive new generating plant . . . completely clad with Alcoa Aluminum. It is an outstanding example of the "new look" in industrial buildings made possible by Alcoa Aluminum.

Much of its architectural interest and striking good looks has been achieved by the way fluted aluminum facing has been applied to intersecting masses. This facing was applied directly to steel girts. The light weight of this aluminum wall system pays off in reduced dead load and minimum foundation requirements. Rapid erection permitted interior work to begin much sooner.

Even though subjected to salt spray from the Pacific, this Alcoa Aluminum facing will retain its beauty and resistance to corrosion. For suggestions on how Alcoa Aluminum can provide *you* with attractive, low-cost buildings, write ALUMINUM COMPANY OF AMERICA, 862-D Alcoa Bldg., Pittsburgh 19, Pa.



OWNER: Pacific Gas and Electric Company, San Francisco
CONSULTING ARCHITECT: William Gladstone Merchant, San Francisco
ENGINEERS and CONTRACTORS: Bechtel Corporation, San Francisco
ALUMINUM Q-PANELS: H. H. Robertson Co., Pittsburgh

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ALCOA ALUMINUM

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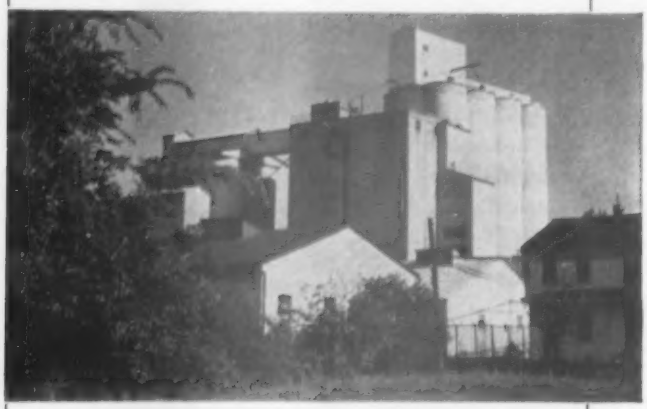
ALTERNATE SUNDAY EVENINGS

Always Fasten Aluminum with Alcoa Aluminum Fasteners

These **"Rooftop"** Armco Buildings solved special problems for industry



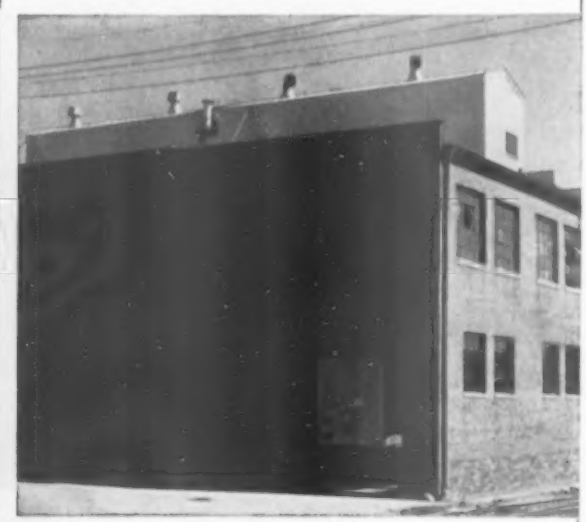
The 746-square-foot Armco Building atop the grain bins was erected to house conveyor machinery and equipment. Standard Armco Buildings are easily adapted to many types of foundation, both on the ground and "in the air" like this one. The installation is at the Highspire, Pennsylvania, granary of the Wheatena Corporation.

Normally, Armco Steel Buildings are erected on solid ground. But here are three industrial space problems that were solved by erecting Armco Steel Buildings on top of existing structures. Simplicity of design and construction, high strength and light weight made Armco Buildings the logical answer.

Write for information on how Armco Steel Buildings can meet your specific needs—economically and efficiently. Armco Drainage & Metal Products, Inc., 3126 Curtis St., Middletown, Ohio. Subsidiary of Armco Steel Corporation. In Canada: write Guelph, Ontario. Export: The Armco International Corporation.

ARMCO Steel Buildings

When additional office space was needed by a large utility company, this 1,800-square-foot Armco Steel Building was selected. Added weight on the original structure was minimized. The wide range of standard sizes made it easy to get the space they needed.



A new heat oven was too high for the New Monarch and Stamping Company's plant at Des Moines, Iowa. Adding an extra floor would have been costly. The economical solution was a 12-ft. high Armco Steel Building installed on the roof, over the new oven.

SECTION C

Electrical Services

GENERAL AWARD WINNERS

The Ebco Manufacturing Company
"Powered for a Big Future" . . . . . C- 2

P. Lorillard Company
"Nine Ways Better — Electrically" C-10

SPECIAL AWARD WINNERS

Central Soya Company, Inc., and McMillen Feed Mills
(Feed Manufacturing Division) C-18

Townsend Company C-18

Silicones Division, Union Carbide and
Carbon Corporation C-19

Garden State Mower Company
Division of U. S. Hammered Piston Ring Co., Inc. C-20

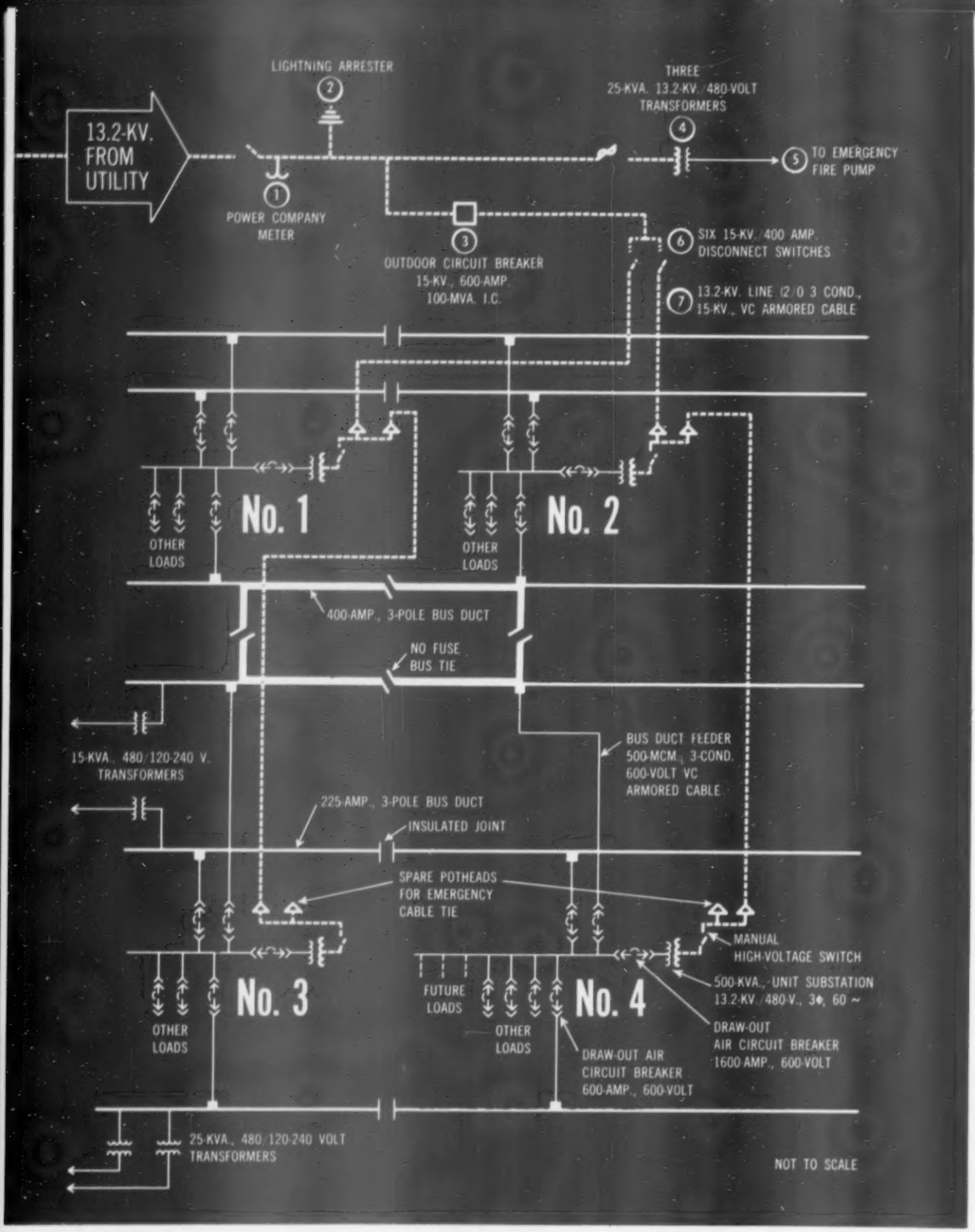
General Electric Company
Specialty Control Department C-20

General Electric Company
General Purpose Control Department C-21

Shell Oil Company C-22

Catalog News C-32

C



OUTSTANDING FEATURES of Ebco's award-winning electrical system can be seen in this one-line diagram. Complete bus-duct coverage of plant provides maximum flexibility. No-fuse bus ties provide excellent reliability at a minimum cost—all four cost only $760. More reliability insurance: By running a line between spare potheads (bottom), Ebco can protect against failure of a primary line. In all, good over-all protection at moderate cost.

THE EBCO MANUFACTURING COMPANY
COLUMBUS, OHIO

FOR CITATION AND EXTERIOR VIEW
OF PLANT, SEE PAGES A-6 AND A-7

Powered for a Big Future

EVER SEE 465-VOLT lighting in a factory? Or hear of a company that had to spend only $760 to insure itself against downtime caused by transformer failures?

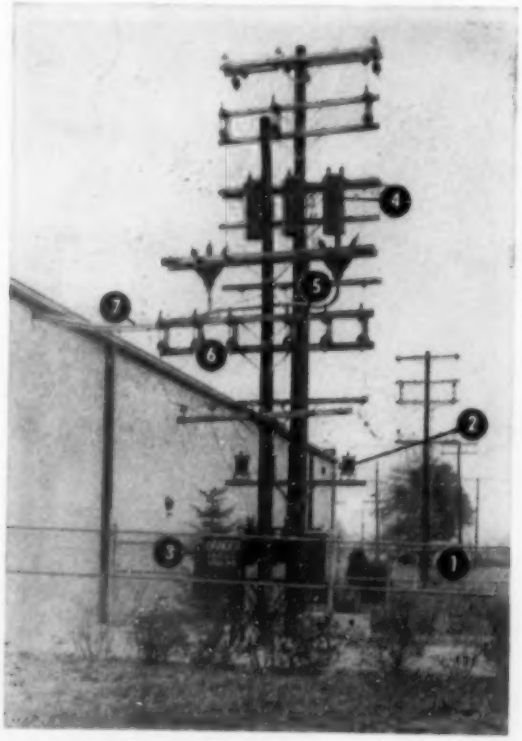
Maybe not. But you can see the lighting and hear how to buy low-cost downtime insurance at Ebco Manufacturing Company's new Columbus plant.

As industrial power users go, Ebco is relatively small potatoes—its electrical load is a modest 1000 kva. But as planners of electrical distribution, the company's executives are big thinkers. Result: They got themselves a flexible, expandable, and reliable system—all at moderate cost.

The new plant is full of features and ideas that mark it a headliner. Many of them—complete air-conditioning, windowless construction, planning for growth, and others—will be detailed later in this article.

But top billing goes to the pace-setting electrical system diagrammed on the facing page.

Its capacity is twice the present load—enough, according to company engineers, to pack the plant, including the present shipping and receiving areas, with production machines.



OUTDOOR SUBSTATION. Key numbers refer to diagram at left. Power is received at 13.2 kilovolts. Station is at corner of plant site, close to utility line, yet out of the way of any plant expansion.

OUTDOOR POWER STATION

A 100-mva. utility-company feeder delivers 13,200-volt power to Ebco's outdoor power station, which is fenced in against a wall at a corner of the plant. It's close to the utility's power line, out of sight from the front of the plant, and out of the way of future expansion. Switchgear is detailed on the diagram and picture at left.

Why no circuit breakers for the dual primaries? Ebco says they're not necessary: "We can afford a 15-min. outage while a short is corrected. A high-voltage outage is extremely unlikely. If the high-voltage end of a transformer begins to burn, individual protection won't save it."

What about expansion? That'll be no problem, according to Ebco. If more substations are added—and there's already space for them—the company will run a third cable out of the high-voltage entry connection and change over to triple instead of double switching.

PENTHOUSE SUBSTATIONS

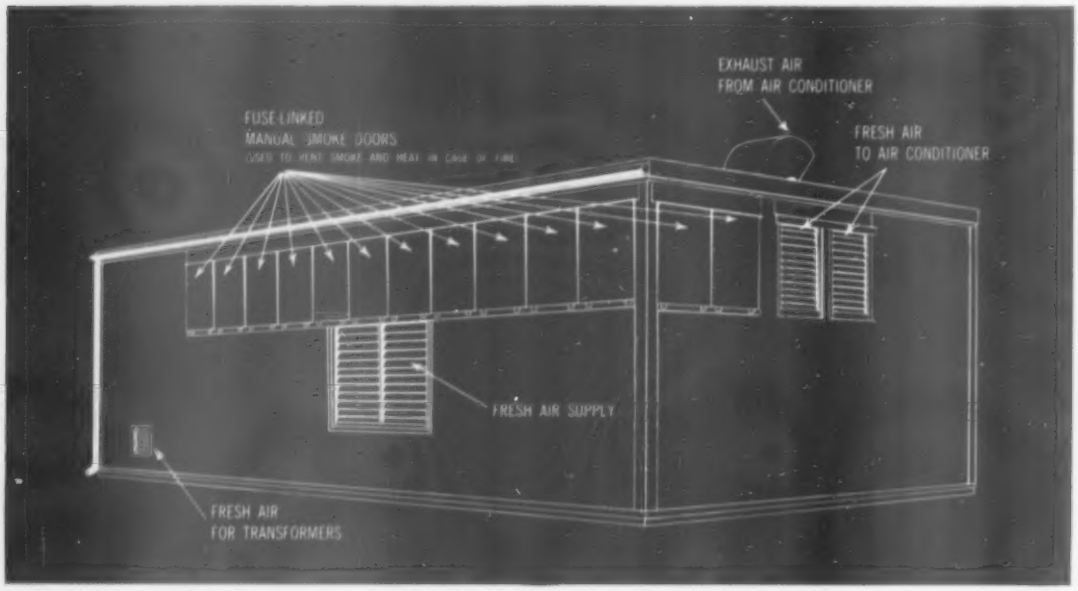
Each unit substation has a 500-kva., pyranol-filled, indoor-type transformer. Primary power lines enter the substations through potheads that are sealed to keep moisture out of the circuitry.

Ahead of the transformer is a disconnect switch with just enough interrupting capacity to handle the transformer's saturation current. This switch is interlocked with a main draw-out air circuit breaker (1600-amp., 600-volt) on the transformer's low-voltage (480-volt) side. The breaker must be opened before the switch on the high-voltage side can be opened or closed. Ebco decided against a circuit breaker on the high-voltage side for economy reasons.

Besides the main breaker, substations in penthouses 1, 2, and 3 have five draw-out air circuit breakers (600-amp., 600 volt)—one for each sec-

Begins on page C-2

"Penthouse substations save space, save money..."



OUTSIDE OF PENTHOUSE is diagrammed here. There are six such units atop the plant. All contain air conditioning units, four contain substations. Rooftop location, Ebco says, "permits efficient transmission of high-voltage power to all plant areas at lowest cost, keeps service equipment out of valuable production space."

INSIDE PENTHOUSE. This is one of the 500-kva. transformers. Two 50-ton air-conditioning units in each penthouse cool the 200,000-sq.ft. production area.

10-MINUTE DOWNTIME. That's the maximum any section of bus duct can be down before the maintenance men can tie it to a neighboring section with this no-fuse bus tie.

ondary line coming out of the transformer. There are no spare positions. Why? Because, if equipment is added to the area served by the transformer, it won't be necessary to add secondary lines. But, on the chance that additional lines just might be needed, there is space in the substation enclosures for more breaker frames.

Expansion plans? The plant was designed for expansion to the north. When that happens, two more unit substations will be installed in penthouses 5 and 6, which are above the north section of the present building and which already have space for substation enclosures.

Why not a single master substation? Ebco planners considered a 2000-kva. master substation at two possible locations—the corner near the high-voltage entry and the center of the plant. It went to four unit substations for these reasons:

. . . *Reliability.* Ebco didn't want to put all its eggs in one basket. If a single master substation (with only one transformer) goes out, the whole plant is down. If one of four unit substations fails you can still switch over to the others.

. . . *Economy.* Step down your power at one point, and you have to move secondary power greater distances. This ups the cost of secondary lines because, says Ebco, you need 28 times more copper to move power at 465 volts than to move it the same distance at 13,200 volts. (Ebco's choice ruled out an intermediate step—4160-volt substations—that might also have proved to be more economical than a king-size one.)

Another economy argument: Penthouses for air-conditioning equipment were already available for unit subs. To put a 13,200 unit master sub on the roof—and that's where Ebco wanted it—would have demanded a special penthouse, plus beefing up the plant's structure to support it.

. . . *Easier expansion.* With a master substation, Ebco felt, expansion wouldn't be as economical. Engineers would rather install extra substation units as they are needed, than install at the outset a more expensive master substation with enough capacity for any forseeable future needs.

PLUG-IN BUS DUCT

Bus duct covers Ebco's plant. There are four quadrants (three bus sections each) of 225-amp., 3-pole duct, each delivering power to a quarter of the plant and each getting power from one of the four unit substations. Feeder cable—delivering power from substations to bus duct runs—is rated at 400 amperes.

How does duct pay off? Provides flexibility, of course. More important, it simplifies the job of adding equipment, something the company is doing—and expects to do—often.

What it serves—It's easier to say what it doesn't serve. Plug-in bus feeds everything in the plant except air-conditioning units, the 150-hp. air compressor mentioned above, a test-department transformer, and a 100-kva., 440/220-volt transformer that supplies single-phase power to spot welders that get direct leads.

Flexible connections—Ebco uses flexible, neoprene-coated cable to connect production machines to bus duct. Reason: quick installation and easy machine movement if necessary. A spring suspension from the ceiling keeps tension on the cable and holds excess cable. Line can be payed out from, or wound up on, the suspension reel when a machine is moved. Water-tight bushings are used at cable connections to the machine's motor starter and the bus duct to keep out moisture and dust.

Downtime insurance—If a transformer fails, the quadrant it serves is powerless for no more than 10 minutes. How come? Because the dead duct can be switched to one or more live transformers in that time or less. The switch: a 400-amp., no-fuse bus tie. Its cost: $190—$125 for material, $65 for labor.

Ebco has four of these bus-tie switches (total cost $760), which, in effect, tie the four bus-duct systems into a single network—all bus-sections fed by all transformers.

Suppose the transformer serving one area (see p. C-2) goes out. You can switch its duct to either of its immediate neighbors. Better yet, you could split the load—switch to both transformers. And then, by some more switching, you could pass some of their load along to still another transformer.

Chances are, you'd have to drop air conditioning served by the dead transformer, Ebco says. And it could be necessary to cut out more air conditioning units.

Here's what a maintenance man would do if a transformer went out:

1. Pull the main breaker on the transformer's low-voltage side.
2. This lets him unlock the high-voltage side and open the switch.
3. Go outside and re-set the oil circuit breaker to put back in business the lines to other transformers fed by the same feeder.
4. Tie the dead bus to one or more live ones. This is done by unlocking the padlock at the tie-in point and throwing a switch. Tie-ins have regular bus-drop plugs, but wires stay inside the duct and are always connected to the next section of bus. Throwing the switch simply energizes the connection.

Other ways to do the same thing? Sure. You could do it with the usual bus connections, but, says Ebco, that would take half a day and "the connections would probably overheat anyway." Or you could go to network distribution. Much more expensive, says Ebco.

Suppose a primary line goes out. That's unlikely, according to the Ebco people. If it should happen, they might use bus ties to switch the load to the transformers served by the live line.

But, if they couldn't make immediate repairs, they'd have to work a transformation—turn their system into a loop system. They'd do this by running a line between two empty potheads on the east side of the plant (bottom of diagram, p. C-2).

Turn the page

Begins on page C-2

HIGH-VOLTAGE LIGHTING

Power for lighting—all fluorescent—is taken off bus duct in rigid conduit. You'd expect it to be 277 volts. Instead, it's 465 volts.

The idea? Economy and easier maintenance. By going to 465-volt lighting, Ebco avoided the need for a fourth (ground) wire in its bus duct. Result: a 25% cut in copper costs.

True, 465-volt ballasts cost close to $1 more per fixture than 277-volt ballasts. But the $1700 added cost (for 1900 fixtures) was less than half the amount saved on copper.

Maintained light levels are 55 footcandles in the factory, 75 footcandles in the offices and engineering department. The factory is lit by 8-ft., double-tube, slim-line, instant-start fluorescents mounted on 10-ft. centers in the production area, on 15-ft. centers in the storage area. Offices and engineering (about 40,000 square feet) have luminous ceilings—8-ft. slim-line tubes mounted on 2-ft. centers above corrugated plastic.

Emergency lighting—Panic is always possible if power fails in a windowless plant. That's one reason why emergency lighting is important at Ebco.

Emergency lighting in the factory is a 100-watt incandescent bulb in every fourth bay. Every office room that gets no light from the factory area has a 25-watt or 100-watt incandescent bulb.

Emergency power is supplied by a 50-kva. generator—480-volt, 60-cycle, 3-phase, with a 100-amp. transformer switch. The generator also powers two pumps—one 10-hp. and one 5-hp.—to drain storm sewers and prevent flooding during storms. And it has enough extra capacity to run a minimum of heating equipment. It runs on natural gas, which is less hazardous to store than gasoline, costs less, guarantees quicker starting. But it will also operate on gasoline.

A failure of 465-volt power in penthouse 4 activates a switch that starts the generator within 5 seconds. When 465-volt power is restored, the generator keeps running for two minutes before cutting out. Its starting ability is tested weekly by simply disconnecting it from the bus duct.

Much metering? No. Ebco doesn't feel it's necessary. Meters on the primary switchgear show demand, kilowatt-hours used, and power factor. The power factor is low—runs around 83.2%—because the plant has a lot of induction motors. While electricity at low p.f. is more costly than at high p.f., the company pays no additional block rate penalty, thus hasn't added capacitors.

There are ammeters, voltmeters, and oil-temperature gages in the substations. There are fans in the transformer rooms. All meters are read daily.

Many motor control centers? Just one. It controls motors of paint shop equipment, including nine ventilating fans, a conveyor, two burners, a rotary washer, and nine pumps.

The control panel has two sections—one for equipment in paint booths and one for other equipment. It takes power off bus duct served by the substation in penthouse 1.

Why no more control centers? Because, Ebco says, it has "few integrated production systems involving motors." Most motors in the plant are 10-hp. or less. Exceptions: the 150-hp. compressor motor; 50-hp. air-conditioning motors; three 30-hp. motors—one on a press, one on an air washer, another on a compressor; plus a 25-hp. motor for the air supply system in the paint shop.

Plant design keeps up the hot pace

Wanted: elbow room—Ask Louis P. Benua, Ebco vice president and works manager, why his company built a new plant, and you get a wry answer: "We had no other choice."

Like a lot of manufacturers in downtown areas, Ebco had simply outgrown its quarters—couldn't expand because it was hemmed in on all sides.

Space was so short the company had to warehouse its products in four rented buildings in other parts of town. Employees lacked places to park their cars. Surrounding streets, narrow and lined with homes, stymied pick-ups and deliveries.

The two-story plant posed other problems. Between-floors handling—by elevators and stairs—was costly. Partitions and non-productive equipment cluttered the manufacturing areas and fouled up the flow of material. The power distribution system was so inflexible that major plant rearrangements meant tearing out and replacing many electrical components.

Found: space to spare—Ebco executives had three key aims when they planned their new plant: low-cost handling, unfettered materials flow, and provisions for future expansion.

The new plant, a single-story building on a large tract near the Columbus airport, meets these needs. Already, Benua says, it has boosted productivity by 20%.

The company has doubled its production area. Handling has been modernized with conveyors and fork trucks. Ample space permits point-of-use storage of parts and materials. The plant is 400x500 feet. Bays are 25x31 feet, and the usable ceiling clearance is 19 feet.

The brick-faced building is windowless except for a floor-to-ceiling window in the lobby and small windows high in a portable expansion wall at the receiving and shipping end. It's air conditioned throughout, even in the shipping and receiving areas.

FIRST IMPRESSIONS at Ebco are bound to be good. The high-ceilinged lobby is as handsome as they come. It's paneled in hardwood, has terrazzo floor—combining top appearance with easy maintenance. Ceiling duct is from 30-ton air conditioner that cools both lobby and office. Notice the flush lighting, the aquarium set in far wall.

LOTS OF IDEAS BEHIND THIS "PRETTY FACE"

The handsome lobby, pictured on this page, symbolizes the effort Ebco put into appearance. More important, however, are the building and plant service features that aren't as obvious at first glance.

Plant is fully air conditioned—Does it pay? Yes. Ebco thinks so. Productivity used to drop during summer dogdays. But last summer, first in the new plant, efficiency went up week after week although outside temperatures stayed in the 90's.

MURAL highlights other lobby wall. Furniture is comfortable. And there are plenty of Ebco's own water coolers.

The entire 200,000-sq.ft. factory is cooled by twelve 50-ton package units—two in each penthouse. A 30-ton unit serves the front office and lobby. No cooling tower is needed because each unit contains its own "tower"—an evaporative condenser.

Operating costs? About 50¢ a day per employee in hot weather. Ebco says that's not too much to pay for increased worker efficiency.

To reduce cooling and heating costs, Ebco takes dirty air from plating and polishing operations, washes it in water, returns it clean to the plant (see FACTORY, February 1956, p. 128).

No windows—Why? To cut building costs, for one good reason. It costs less to build a plant without windows than with them. Fact is, Ebco says that savings alone almost paid for its $89,000 air-conditioning system.

But there were other and, possibly, more important reasons why the company decided against windows. For instance:

. . . *Lower heating costs.* Elimination of windows cut the potential heat loss in zero weather by 50%. Fuel saving: $1.25 an hour.

. . . *Lower cooling costs.* Windowless construction cut the potential heat gain in 90-deg. weather by 50%. Adds Ebco: If the plant had windows, the cost of air-conditioning it would be prohibitive.

Turn the page

C

Begins on page C-2

"It costs less to build a plant without windows..."

PRE-FAB OFFICES give foremen an all-round view of their departments. Washstand and drinking fountain locations save lots of steps daily for department employees.

OVERSIZE CAFETERIA can feed 500 people, although present employment is only 267. Belt conveyor (shown at far left) takes dirty dishes to kitchen in the rear.

. . . *Uniform lighting.* No glare, no shadows. Result, says Ebco, is higher working efficiency, improved worker morale.

. . . *Lower maintenance costs.* On window washing alone, the company saved $5000 a year. And it'll save, too, by not having to maintain sash.

Dual-fuel heating—Six 1,750,000-Btu. penthouse units heat the factory area. Each unit has a dual burner, can use either natural gas or fuel oil. Switching from one fuel to the other takes no more than 10 minutes.

Overhead ductwork delivers warm and cool air to the factory. The front offices and lobby are steam heated by a separate automatic steam generator.

Temperature control—It's centralized at a control panel next to the maintenance supervisor's office. A recorder on the panel lets the maintenance supervisor or plant engineer take readings or temperatures in six factory zones, the office, and the lobby. It shows outlet temperature, inlet temperature, and space temperature, as well as outdoor wet- and dry-bulb temperatures.

From a switchboard Ebco people can . . .

. . . *Turn on the heating system,* and let thermostats take over.

. . . *Turn on the cooling system,* and let a different set of thermostats take control.

. . . *Proportion* indoor and outdoor air.

. . . *Switch over* to ventilation. This way in spring and fall the same fans circulate air through the plant while heating and cooling systems are idle.

. . . *Switch to night* heating. A thermostat controls both fans and heating.

Room for growth—Besides designing excess capacity into its electrical system and providing space for more substations, Ebco planned for expansion in other ways: Some examples:

. . . *Expansion wall.* A 400-ft. wall along the receiving and shipping areas at the north end of the plant is portable. It consists of 4x10-ft. rubber-treated steel sheets, bolted to a T-bar frame and starting at a height of 3 feet. Below the 3-ft. level is a standard wall that would be knocked out in an expansion move.

. . . *Two-track railroad siding.* Double tracks were extended from inside the plant to a point 500 feet north of it. So a plant addition can be built over the tracks without moving them.

. . . *Oversized paint room.* Its excess capacity is 125%. That's a lot. But there's a sound reason: The room is the only production department enclosed by masonry walls.

. . . *Oversize utility lines.* One example: a 6-in. line through which natural gas is piped into the plant at high pressure. This line runs across the plant. Two 3-in. header lines, 150 feet apart, run the length of the building. All gas piping has welded stubbed T's to meet future needs for extra outlets.

Another example: a 4-in. water line. This line runs halfway across the plant. A 3-in. line continues across the other half, and a 4-in. pipe, taken off the main incoming line, runs the length of the plant. Here, too, there are extra stubbed T's.

Ebco also provided stubbed T's for extra outlets on its compressed air line and for extra inlets on duct work that takes dust-laden air from polishing lathes to an air washer.

. . . *Oversize cafeteria.* It was planned to feed 500, although current employment totals only 267.

. . . *Oversized parking lot.* And space for a still

bigger one. The black-topped and lined lot accommodates 225 cars.

And flexibility, too—In a plant like this, flexibility almost goes without saying. Examples already mentioned include bus duct, flexible cables between bus duct and machines, dual-fuel heating units, package air-conditioning units, extra outlets on utility and compressed-air lines, extra inlets on duct to an air washer.

Here are two more ideas that help Ebco insure flexibility:

. . . *Rubber machine mounts* not cemented to the floor. Heavy machines were set on pads instead of being bolted to the floor.

. . . *Pre-fab foremen's offices.* These offices, right out in production departments, are toe-nailed to the floor. They have large glass windows, give foremen all-around view of areas they supervise.

"Keep it off the floor"—That was almost a byword when Ebco located non-productive equipment in its new plant. Aim was to free as much floor space as possible for production machines and to get unobstructed straight-line flow of materials.

You've already seen how substations and heating and cooling units were put in penthouses. Here are some other space-savers:

. . . *Mezzanine.* It runs along the east side of the plant above engineering, the cafeteria, and display rooms. Mounted on the mezzanine are the air-conditioning units for the front offices and lobby.

The mezzanine is also used for storing spare motors, partly obsolete jigs, experimental models, and the like. Each plant department is assigned part of the mezzanine area for storage.

. . . *Restroom roofs.* Here's where Ebco put steam generators.

PLANT SERVICE IDEAS

Moisture-free compressed air—Ebco wrings moisture out of compressed air by air-conditioning it—passing it through coils that refrigerate it to 35 degrees F.

Expensive equipment? No. Fact is, it paid for itself right off the bat by eliminating the need for moisture traps normally needed in air lines.

Does it pay off? Sure does—by doubling the life of high-speed, air-powered tools such as screwdrivers, grinders, and drills. Longer life stems from the fact that no water droplets get into tools, and, even more important, that erosion by rust particles is prevented.

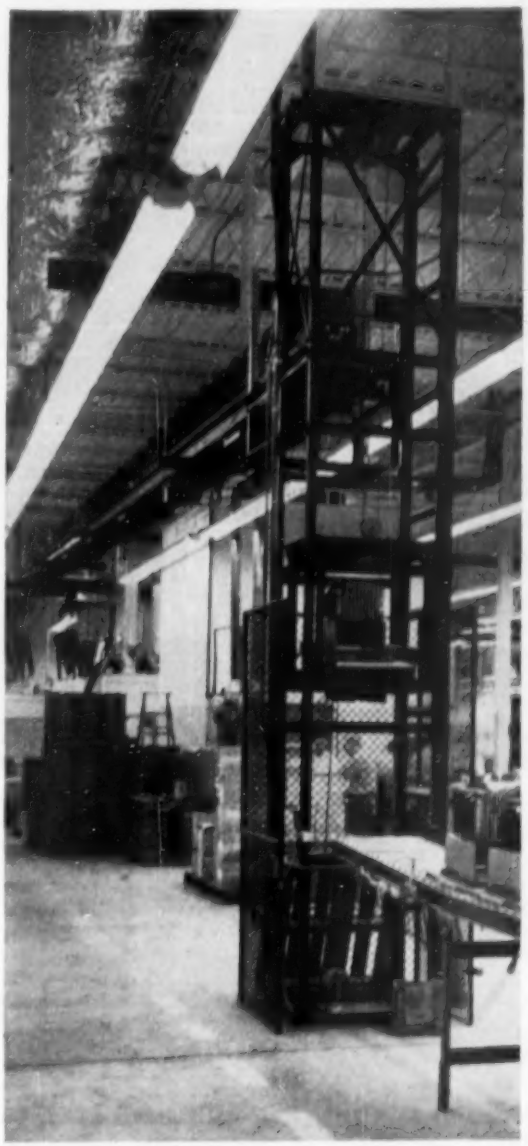
Fire-control features—Ebco's plant has standard fire-control equipment plus these extras:

. . . *Fire curtains.* They divide the plant into three areas, keep flames from spreading along the ceiling. The curtains are corrugated-steel strips suspended to 5 feet beneath the ceiling. Cost of curtains: $1300.

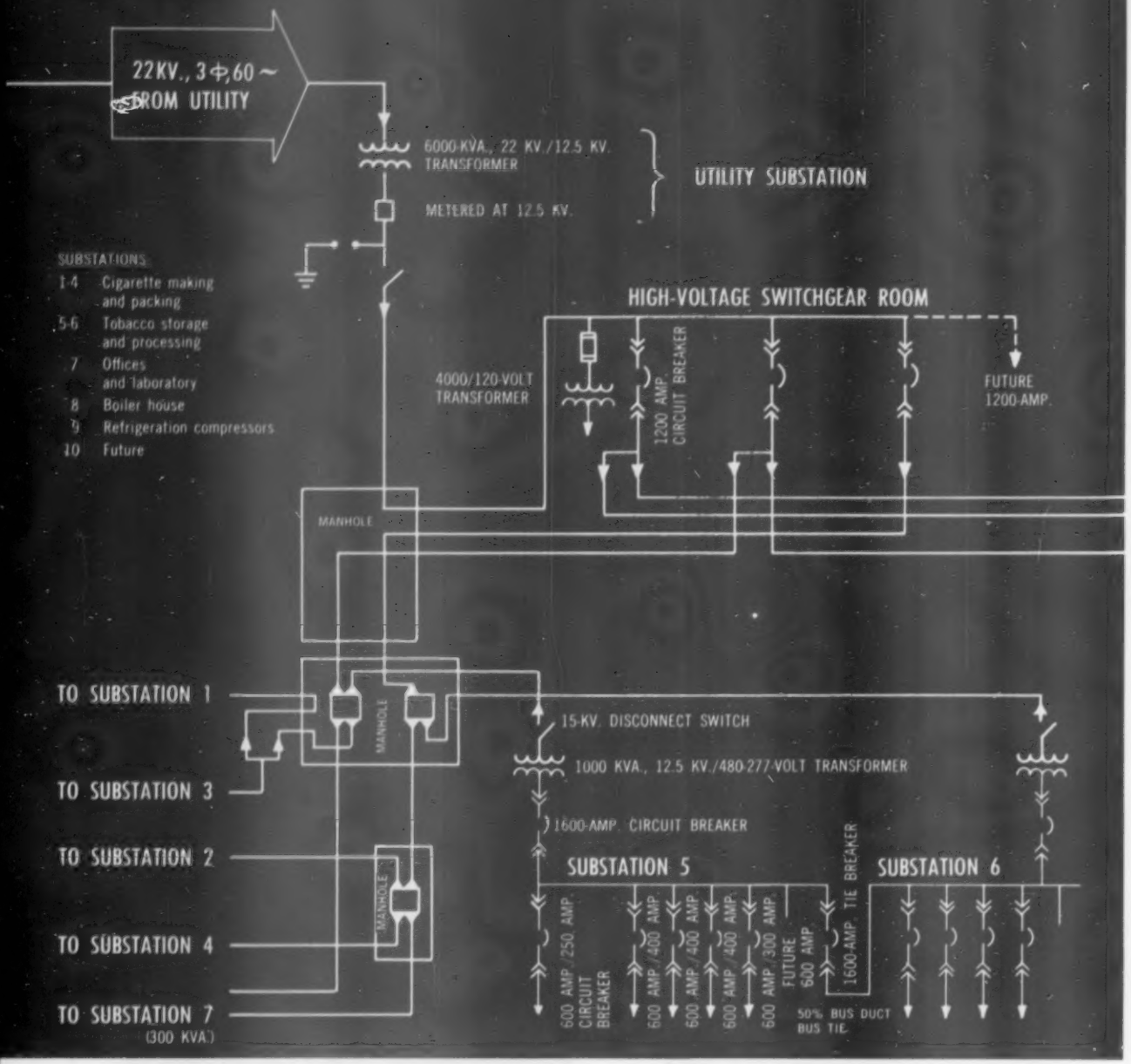
. . . *Smoke doors.* 78 doors—13 in each penthouse—will vent the plant of smoke in case of fire. Each door can be opened manually or automatically—by a fused link in the chain.

. . . *Paint-room precautions.* An automatic carbon-dioxide system protects the paint department. The paint-room walls are masonry, and the outlets are fire doors.

Standard fire protection includes six outdoor hydrants and a sprinkler system. Sprinklers have an independent water supply. A 100-hp. emergency fire pump is housed in a small building west of the plant. Power for the pump is taken off the main 13,200-volt primary line ahead of the oil circuit breaker in the outdoor switchgear. It passes through three 15-kv. fused disconnect switches, then is stepped down to 480 volts, 3-phase by three 25-kva., single-phase transformers.



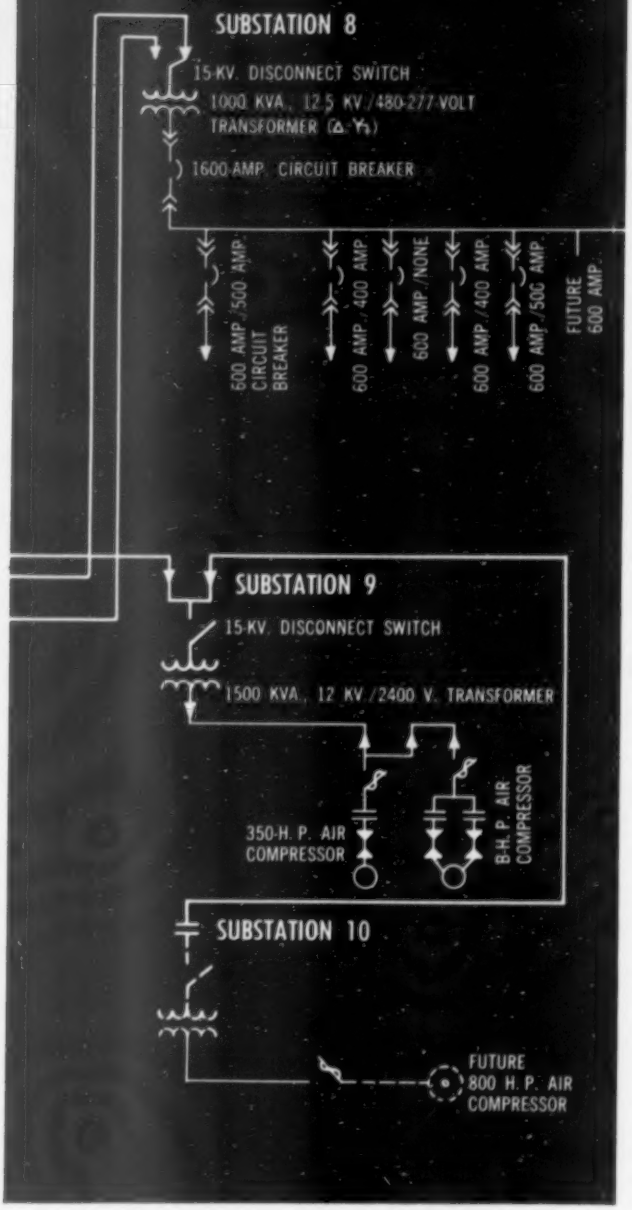
"OFF THE FLOOR." Elevator that hoists parts to overhead conveyor for temporary and surge storage perfectly exemplifies this Ebco philosophy.



BETTER POWER for making top-quality cigarettes comes from this electrical distribution system with nine unit substations and room for a tenth. Cable ties join substations 1 and 2, 3 and 4 in pairs to serve the cigarette-making room. Bus tie joins Nos. 5 and 6, which provide power for tobacco processing. High-voltage primary distribution pays off be-

Nine Ways Better Electrically

AHEAD OF THE PARADE electrically. Other ways, too. That's the new cigarette plant of P. Lorillard Company at Greensboro, N. C. This outstanding new plant tucks within its walls nine of today's ten hottest electrical trends. (No. 10 is "more use of d-c power," which Lorillard doesn't need.) Why did Lorillard come up with its parade-leading electrical facilities? It wanted to improve an already top cigarette and—at the same time—adapt production to shifting consumer habits, such as the recent



cause voltage losses on long cable runs are low, less copper is needed, primary switching costs less, high-voltage switch arrangement is simplified, and there's flexibility for growth.

swing to filter tips. So Lorillard designed its plant for freedom to rearrange at minimum cost—without sacrificing reliability or economy of plant services, especially electric power.

The nine trends—and how they're reflected:

1. Better power planning—Incoming power is reliable—and more than ample for future growth. It's brought in from a Duke Power Company loop circuit at 22,000 volts, reduced to 12,500 volts at a utility-owned master substation, and metered on the low-voltage side of the 6000-kva. transformer bank.

P. LORILLARD COMPANY
GREENSBORO, N. C.

FOR CITATION AND EXTERIOR VIEW OF PLANT, SEE PAGES A-6 AND A-7

Lorillard didn't erect its own master substation. Wouldn't have paid off. Savings in high-voltage discounts wouldn't offset added costs of fixed charges and maintenance. Besides, Duke can quickly add transformer capacity if Lorillard exceeds estimated near-future maximum demand (6900 kva.).

Lorillard's incoming line structure is simple, safe, maintenance-free, designed for tomorrow's needs. It's a bolted H-frame, with minimum plates and gussets. To prevent corrosion it was galvanized (hot-dipped) after fabrication (FACTORY, December 1954, p. 142). Strain insulators are hefty enough to absorb aerial-feeder tension from Duke's master substation.

Single-pole station-type arresters on the 12.5-kv., 3-phase, grounded-Y system protect equipment from lightning surges. And to kill plant power for emergency repairs to main transformer or incoming feeder —or for adding main transformer capacity or working on high-voltage switchgear—there are three (one for each phase) outdoor single-pole throw switches, gang-operated by a remote, ground-level handle that's fitted for padlocking in either direction.

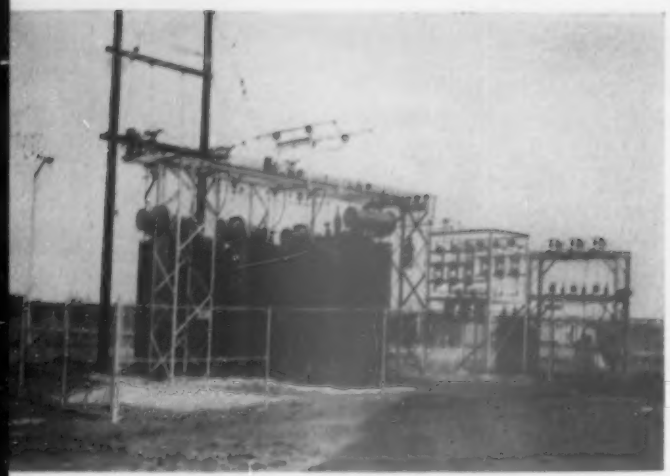
2. Better protection against short circuits—With cascaded low-voltage fault protection. Each of the three incoming 13.8-kv., 1200-amp., electrically operated draw-out circuit breakers has interrupting capacity of 150,000 kva. They can withstand the wallop and safely interrupt a short-circuit fault imposed by the main transformer and plant motors. Each breaker is equipped with induction inverse-time overcurrent relays for coordinated protection (with the main breakers) of the nine substations. Inverse-time overcurrent and ground-fault relays (single-phase) guard against ground faults in the 12.5-kv. grounded system.

The main low-voltage breakers on eight of the nine unit substations are rated 1600-amp. continuous, 50,000-amp. I.C. They have adjustable dual magnetic overcurrent trips, and an instantaneous trip to operate in cascade with feeder breakers. The low-voltage feeder breakers, 600-amp., have 25,000-amp. I.C. They're equipped with a dual magnetic trip with an 80-160% adjustment of the trip rating.

The cascaded system for unit substations serving manufacturing saved Lorillard some $30,000 in breaker cost. That's because a feeder breaker of 25,000-amp. I.C. interrupts faults up to 50,000 (I.C. of the main low-voltage breaker).

How? By setting the instantaneous trip of the main low-voltage breaker to 80% I.C. of the feeder breaker. This way, Lorillard made some sacrifice of the service reliability of a selective system (FACTORY, December 1955, p. 118). It means that whenever a feeder short circuit draws a current over 80% of the I.C. of the feeder breaker, the main breaker also trips out.

Turn the page



Outside From 22,000-volt loop circuit, master substation feeds 12.5-kv. power to nine unit substations inside Lorillard's big new plant.

Inside Bus tie joins substation 5, 6. Four other substations are joined in pairs by tie cables. Ties can carry as much as 50% of one substation's load.

Begins on page C-10

"The entire electrical system is 'blue chip'"

This shuts off service to all feeders (or breakers) until power is restored by closing the main low-voltage breaker. But this temporary interruption on the unfaulted circuits is not serious, because most operations can sustain a temporary loss of power without disrupting production or impairing product quality. Besides, the entire electrical system is "blue chip," and the risk of shorts is slim.

3. Higher voltages in the plant—Primary voltage is 12.5 kv. (close to the 15-kv. National Electrical Code limit for buildings). Lorillard could have chosen a lower voltage—say 4160. But it wanted every advantage of operating economies—and primary voltage that would produce greater economies at greater future loads. And since 12.5 kv. was the utility's standard, why pay extra for transformation to a lower in-plant voltage? Further, the long-term estimate of future demand is 9000 kva. That's close enough to 10,000 kva., the point at which economies of a 12.5-kv. system overbalance a 4160-volt system.

Lorillard chose 480 volts for secondary distribution. It's the most economical for plants of this size. Besides, it's logical with 277-volt fluorescent lighting —of which Lorillard has some 1200 kva.

There's some 120/208-volt distribution in the office and laboratory, where commercial-type equipment and fractional-horsepower motors and equipment are used. Also 120-volt lighting.

Lorillard runs a 350- and an 800-hp. motor for air conditioning compressors on 2400 volts. Why not 4160 or higher? Since the motors are fed from one unit substation (No. 9), transformation cost is much the same. But cost of 2300-volt motors is less than that of 4000-volt (or higher) motors and starters.

4. More substations — Lorillard has nine, plus room for a tenth. Seven are 1000 kva. Six (Nos. 1, 2, 3, 4, 5 and 6) of these seven serve manufacturing areas; the other (No. 8), the boiler house. All seven are located in ventilated rooms close to the load. They're within the most economical range (750 to 1500 kva.) for 480-volt radial distribution.

No. 7, a smaller unit (300-kva., 120/208 volts) in the laboratory basement, serves offices and laboratories. And substation No. 9 (1500-kva., 12.5-kv./2400 volts) handles the large motors of the refrigeration plant.

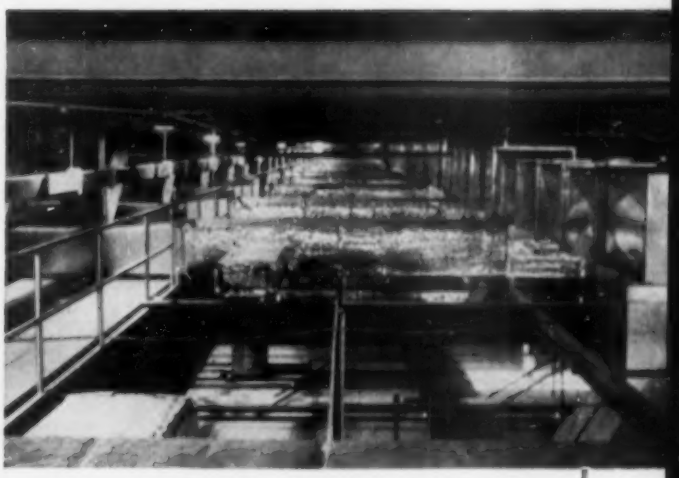
The transformers are dry-type, with two primary, manual, internal-type, 2½% full-capacity taps above and below 12.5 kv. Fans can increase rating to 133% of self-cooled rating.

Switchgear is metal clad. High-voltage incoming line section (except 300-kva.) houses a 15-kv.-class gang-operated air-break 400-amp. switch along with potheads bussed to the switch. Low-voltage switchgear (except the 300-kva. unit) houses draw-out air circuit breakers (trip free) for 4-wire, 3-phase, 480-volt, grounded-neutral service. Each breaker has potential and current transformers for metering.

The 300-kva. substation's incoming line section has a 400-amp. double-throw selector switch (and pothead for each of the two incoming lines) and disconnecting-type, high-interrupting, high-speed fuses (60-amp.) coordinated with the 13.8-kv. breaker. Low-voltage breakers of the 300-kva. unit are molded-case, rated at 25,000-amp. I.C., 208 volts, with thermal overload and adjustable instantaneous trips.

5. More flexible circuits—Simple primary radial systems (the least expensive type) do the trick for the six substations for processing and manufacturing. One feeder supplies Nos. 1, 3, and 5; a second feeder, Nos. 2, 4, and 6. The same kind of system supplies No. 9. Selective radials, fed from two of the

Underground Frequent manholes with spare conduit make it easy to pull new cable if a primary cable fails. They make expansion easy.



Overhead Plug-in bus duct (left) runs above ceiling to serve the big making room, as do air-conditioning ductwork and other service lines.

high-voltage breakers, insure reliability for substations Nos. 7 and 8. Manholes and spare underfloor conduit make it easy to pull a new cable if a primary feeder fails—or to install a future selective system or expand the secondary distribution system.

To offset the slight risk of extended downtime, the secondary system (480 volts) has built-in reliability. Substations have about 20% of spare capacity—and can be boosted another 33% above self-cooled rating. Also, each substation has at least one spare position for future secondary breakers. And each of the six substations for processing and manufacturing is equipped with a 1600-amp., 50,000-amp. I.C. tie circuit breaker. Each tie breaker (normally open) is big enough to handle the load—and short-circuit current—of an entire substation. They are interlocked with the main low-voltage breakers.

Overhead tie cables join four of the substations in pairs—Nos. 1 and 2, Nos. 3 and 4. A bus tie joins Nos. 5 and 6. All ties—cable and bus—can carry 50% of the load of one substation—about 500 kva. That's about as much as can be shifted without interrupting production. With spare capacity, the chance of having to drop any load is slight.

6. Better conductors—Plug-in bus duct, 480/277-volt, covers the "making" room and blending and cutting areas, where changing production methods might necessitate machine moves. Covers the machine shop, too. In other areas simple conduit and conduit runs—some tapped off bus duct—do the job. In the "making" room bus duct is above the hung ceiling, accessible from catwalks.

Plug-in fused switches serve as a protecting device and junction box to provide power. Switches (frame only) are oversized for any increase in electrical equipment per machine or for larger motors. But fuses are sized for present loads—for example, a 30-amp. switch with a 15-amp. fuse.

Trolley bus provides power for 120-volt fluorescent lighting in the shop. It's a flexible installation. Fixtures are suspended right from the trolley busway, can be moved to any position on the busway. A separate trolley bus supplies the 120/208-volt power needed for shop tools.

To provide power for the heater on every cigarette machine, Lorillard draws from the 480-volt bus duct. Voltage is stepped down in one of several dry-type, 480/208-volt, Y-connected transformers located above the hung ceiling. Power then travels through a 4-wire, 3-phase system with solid neutral to a switch panel. Each of the four lines from every switch panel provides 120 volts to 10 machines.

7. Better controls—Designed to fit the need. In some areas controls are on single panel boards. But mostly Lorillard wanted workers to see a conveyor start before starting the flow of tobacco, thus avoid costly jams if a belt should slip or break.

Where necessary, motors are controlled by magnetic starters, can be stopped from several locations. Magnetic contactors are on the 277-volt fluorescents, with low-voltage wall switches for the contactor. In fact, wherever magnetic controllers are used, control voltages are 120 volts. Most small motors (on light conveyors, for example) are manual start. Job requirements—with flexibility and economy—were the rule for each selection.

8. Combined power and lighting—The trend is to 277-volt lighting—and Lorillard has it. It's a natural with 480-volt secondary distribution. Power comes directly from the unit substations. No need for small dry-type lighting transformers. The system fits well where lighting load is high and concentrated.

9. Operating economy—Here's the payoff for high-voltage primary distribution: Voltage losses on long cable runs are minimized, less copper is needed, primary switching costs less, high-voltage bus arrangement is simplified, and there's flexibility. The 480-volt secondary system costs about 25% less than a 240-volt system, and line losses are low. And 277-volt lighting may save as much as 40% in installation costs. Not to mention the economy that results from using higher voltage power.

Begins on page C-10

"Today Lorillard has just the plant it wants"

In and out Tobacco and materials for making and packing cigarettes enter from long rail dock stretching off to left or from recessed truck dock (center). Finished cigarettes leave from rail dock (right) or truck dock beyond corner at extreme right. Two large parking lots provide space for 650 automobiles.

Lorillard wanted a plant that would accommodate the latest in cigarette-making methods and equipment, cut handling costs bone deep, give room for growth. Wanted it to look good, too.

Today Lorillard has just the plant it wants. Single-story with partial basement. On an 80-acre tract just beyond the city limits. Some 650,000 square feet of floor space. Some 1250 people busy when the plant runs full tilt.

Built for handling—Raw materials enter on the west and north sides, pass through processing and manufacturing. Finished cigarettes emerge—ready for shipping—on the west side, close to receiving.

With minor exceptions, it's a one-level plant. Lift trucks and conveyors do the handling. Lorillard estimates construction and layout save up to 50% on handling labor. Typical handling facility: the built-in steel-slab conveyor that hauls hogsheads of tobacco from storage, carries them to an automatic tip-over, and moves the unloaded tobacco to processing. Return circuits of the conveyor are beneath the floor, as is much of the mechanism.

Built for special needs—Ceiling height and bay sizes accommodate the special needs of bulk handling and cigarette manufacturing. For example, complex machinery that blends tobacco mechanically and automatically—perfectly, too.

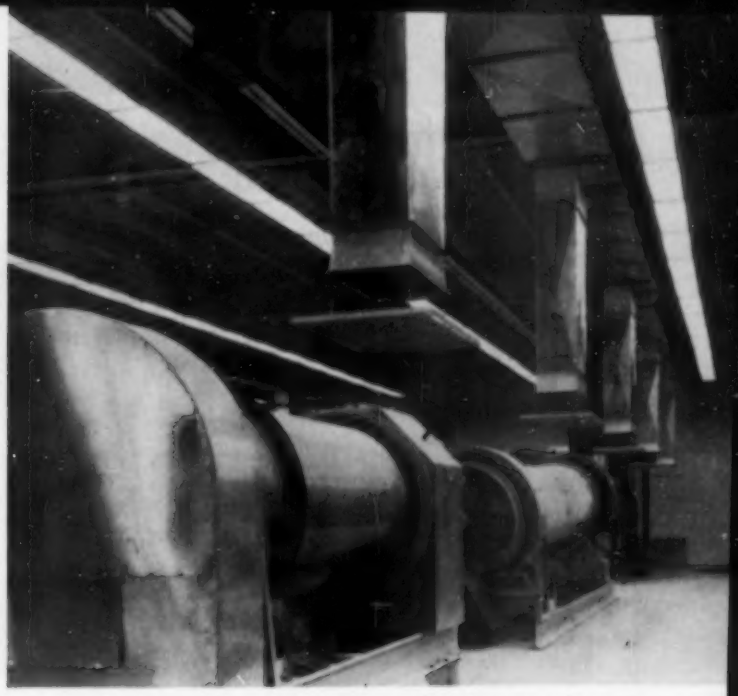
Special rooms, also. For example: a 21x60-ft. storage vault, with blow-out windows, for certain flavoring ingredients; a cooper shop, where hogsheads can be rebuilt, just off the hogshead storage area; a room for storing and treating oriental tobaccos.

Built for change—Regular and king-size, filter-tipped and untipped—each style takes different machines, different layout. Lorillard is ready for any turn. Bays in the 310x457-ft. cigarette-making room are 40x54 feet—big enough to move machines around in. Air-conditioning ductwork and other service lines are above the 16-ft. hung ceiling, do not interfere with machine moves. Overhead bus duct permits moves without changes in wiring. And fluorescent lighting means plenty of candlepower everywhere.

In processing areas, where tobacco is blended, cut, dried, and treated, the same principles prevail. Bays average 30x40 feet. Bus duct makes it easy to move machinery around. Steam, water, and air

Quality insurance Airlocks like this seal off the making room from others, insure constant temperature and humidity.

Service lines Water, steam, power, and air run overhead (color-coded, too) in hallway outside the making room.



...and services In the cutting and drying room, for instance, conditioned air spills down, bus duct is overhead, fluorescent light pours everywhere.

lines are within reach almost everywhere. What's more, roof is wood plank (instead of concrete plank on steel, as in the cigarette-making area). Why? Because, in tobacco processing, exhaust vents have to pierce roof—and a wood roof is easier to pierce, then seal again.

Built for growth—Tomorrow's complex, high-speed machines will demand more power, more services. With its new plant, Lorillard is ready for them.

For example, there's room for new buildings on the 80-acre tract. The boiler house has room for a third boiler, another refrigeration compressor, and another air compressor. Mains, steam lines, and air lines are oversize. Power capacity now is 20% above estimated future needs—can be increased another 33 1/3% by air-cooling the transformers.

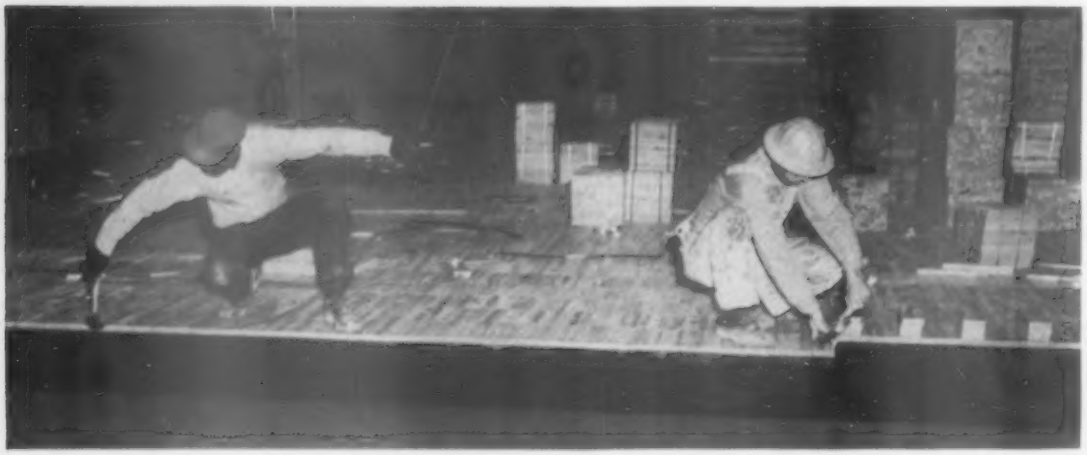
What's more, walls have been eliminated wherever possible, so that areas are as large—and flexible—as state laws, insurance rules, and needs permit.

Turn the page

Safety insurance Visitors' gallery gives guests unobstructed view of machines that make and pack cigarettes by the millions. Gallery also keeps them off manufacturing floor, where they might be caught in whirring machines or distract workers. Gallery is completely tiled except for concrete floor.

Begins on page C-10

"Handsome is the word for Lorillard's new plant"



Good standing Maple-strip floor in the vast cigarette-making room is handsome, vibration-absorbent, easy for machine operators to stand on. Metal splines bind rows of strips together, mastic and felt provide vapor seal on top of concrete floor. Metal sheets beneath machines keep grease off floor.

Built for administration—Offices are clustered at the front of the plant, near the reception area. Wings extend east and west from the lobby area. In the east wing are business and clerical offices. In the west wing are research offices, laboratories, and a library. On each side of the hallway that runs north from the reception room are offices for plant executives—plus rooms for interviewing, records, and medical services.

Built for looks—Handsome is the word. Exterior brick is a mixture of various shades of buff. Touches of marble and aluminum here and there, together with plantings, add interest. The curved entrance, glassed in and angled off from the front of the building, looks warm and cordial.

Inside, colors minimize fatigue, make the plant look bright and clean. In the "making" room, ceiling is white (and sound-absorbent), walls are light buff and green (glazed tile), and doors, frames, and metal surfaces are muted green. In the corridors, tile wainscoting (to a height of about eight feet) is a light beige, walls above are chromax green, and doors, frames, and metal are muted green. Women's restrooms are light rose; men's, maize. Long walls in the cafeteria are light blue glazed tile; end walls, light rose; doors and frames, pewter color.

For machines, Lorillard has settled on light green.

BETTER PLANT SERVICES

Every service for the "making" room—It's the heart of the plant. It's where shredded, blended tobacco is wrapped in fine-quality paper and cut to uniform cigarettes for the familiar Old Gold and Kent packages. It's full of whirring machines. More people work here than in any other part of the plant. That's why the room is built with service rooms on east and west walls: 2 stockrooms, 4 restrooms, revenue-stamp room (barred and bolted), clerical room, paste room, shop locker room, supervisory offices, and four rooms for substations that provide power for the machines. And for convenient, quick repairs, a machine maintenance shop at the northeast corner of the "making" room.

Climate control—Air conditioning nearly everywhere—all from a main chilled-water system. Why? Because tobacco is sensitive to temperature and humidity. To make cigarettes to exacting standards, Lorillard had to have climate control.

Two refrigeration compressors (an 850-ton continuously operating unit and a 350-ton fully automatic unit that cuts in when the load demands it) are installed in the boiler house. Chilled water is pumped through a 12-in. pipe, then travels through overhead mains to six penthouses, where fans, washers, automatic filters, steam coils, pumps, instruments, and time-cycle controls are located.

Conditioned air is distributed from the penthouse through overhead ductwork (insulated with foil and glass fiber in the penthouses, above the hung ceiling in the "making" room, and wherever it passes through non-conditioned areas). Cool air comes from the chilled-water circuit, warm air from steam coils in the air washers. It spills out through diffusers above processing and manufacturing areas, returns through intake grills. Roof ventilators supplement evaporative cooling for some processing areas.

Look at the rigid temperature and humidity requirements (figures are ± 2) met by the system:

. . . *Blending.* Year-round humidity, 62%. Temperature: winter, 75F; summer, with evaporative cooling, 93F; summer with future refrigeration, 84F.

. . . *Cutting and drying.* Year-round humidity, 60%. Temperature: winter, 75F; summer 81F.

. . . *Bulking.* Year-round humidity, 70%. Temperature: winter, 85F; summer, 89F. (Fifteen atomizers on water system with reheat coils.)

. . . *Cut storage.* Year-round humidity, 60%. Temperature: winter, 75F; summer, 81F.

. . . *Cigarette making and packing.* Summer and winter: 76F, 56 RH. Eight air-supply systems. Four airlocks seal room from storage and shipping. Each airlock is made up of two pairs of twin folding doors enclosing a 10x20 ft. passageway. Doors are electric. Each pair has a self-closing man-door.

. . . *Shops.* Winter, 70F; summer, 85F, 43% RH.

In areas without chilled-water air conditioning, aim is to keep air moving. Storage, drying, shipping, and receiving are warmed by ceiling heater-blower units, cooled by roof ventilators. The storage basement has eight 20-in. fans. The tank room has two 20-in. fans, one to run in winter, both in summer. In parts of the plant where additional cooling may be needed in the future, apparatus has been designed to use chilled water in the sprays. Only things needed: a short run of pipe from the chilled-water loop system, plus some more compressor capacity.

To ease the load on the cooling system, the roof is insulated with a layer of 2- and 3-in. foam-glass and is covered with reflective white marble chips.

Water and air—In loop systems. Lines from the boiler house pass over a railroad spur via a steel bridge, fan out through the plant.

Receiving and shipping—Packing materials (wrappings, cartons, glue, etc.) enter via a 46-ft. truck dock or a 400-ft. railroad dock on the west and north sides, respectively, of the L-shaped packing material storage area. A parallel track of the same spur delivers hogsheads of tobacco and other raw materials to a 450-ft. dock offset from the first dock and extending beyond it.

Finished cigarettes leave plant close to where raw materials enter. Shipping facilities include a 144-ft. truck dock, facing west, an adjacent 135-ft. railroad dock facing north. Both docks are on west side of plant, where finished cigarettes are stored.

Communications—An intra-plant dial telephone system with voice paging reaches every part of the plant. The laboratory has its own intercom system.

Boiler house—In it are two 35,000-lb. per hour boilers, plus room for a third. Primary fuel is natural gas; standby, oil. What's more, boilers are designed for easy conversion to coal.

What else in the boiler house? Refrigeration compressors, high-voltage switchgear, air compressors (including a special compressor for oil-free instrument air), and a water-cooling tower on the roof.

Storage—Plenty of room to store anything (spare machines, motors, equipment, etc.) in the 290x330-ft. basement. It includes a truck garage and a 22x30-ft. room for liquid-ingredient storage tanks and pumps. Contour of the land made it possible to build the basement at minimum cost.

A smaller basement beneath the laboratory wing houses engineering rooms, sweat room, specification test room, sample and drying room.

EMPLOYEE SERVICES

Workers enter through the east or west foyers from either of two large parking lots. (Combined space in these parking lots will serve a total of 650 cars.) Another entrance, near the personnel and medical offices, is provided for job seekers.

In addition to restrooms in the reception and office areas and in the laboratory and four restrooms adjoining the "making" room, seven locker rooms (with wash fountains, showers, and toilets) are strategically located in the plant—three for women, four for men. And there's a locker room for supervisors also. Lockers everywhere are oversize—wide enough to accommodate clothes hangers.

A cafeteria provides hot and cold foods on three serving lines. A fold-away stage is located at one end of the cafeteria for meetings or recreational activities. Folding partitions divide the big room into smaller meeting rooms. A conveyor returns soiled dishes to the kitchen.

Examining and first-aid rooms are near the east entrance. A registered nurse is on duty during working hours and a doctor is on call.

NO WORRY ABOUT MAINTENANCE

Outside—Almost no painting needed. Not with brick walls, aluminum window frames, marble trim, and—here and there—aluminum coping and panels.

Walls—Glazed tile in most areas. In some rooms the tile extends right to the ceiling. Elsewhere it forms an 8-ft. wainscoting. This makes walls easy to dust or scrub.

Floors—Concrete everywhere. But some floors are specially covered. Where wear is heavy, they're topped with hard-surfacing. In office areas, they're covered with vinyl and rubber tile. In the spacious cigarette-making room, they're covered with 1x2½x12-in. maple flooring. It's a floor that's handsome, long-wearing, easy to maintain, and comfortable for machine operators to stand on.

BUILT-IN-SAFETY

A sprinkler system covers the entire plant. City mains are the primary source of water, and there's a 250,000-gal. storage tank to backstop the city supply. Hose reels and hand extinguishers are strategically spotted inside and outside the plant. Also, there's an automatic smoke detection and control system in the ductwork, with a central control station for the fire supervisor.

The "making" room is completely enclosed by its own fire wall, as are hogshead-storage and cutting-and-drying rooms.

Wherever emergency lighting might be needed, it's provided by small battery-powered floodlights that turn on automatically. And an automatic policing system sounds an alarm whenever any exterior door outside the fenced-in area is opened.

Explosion-proof fixtures? Not needed anywhere except in the laboratory's solvent-storage room and in the ingredient-storage vault.

ELECTRICAL SERVICES

Special Awards . . .

. . . awards made to plants that are outstanding in some one respect, or in which there is an unusual feature of broad significance.

Capacitors Do Two Jobs

Almost everyone, these days, knows all about installing capacitors to boost power factor (though not everyone does something about it). Even so, Central Soya's story has a twist that may interest you, could save you money.

Company engineers have installed 54 individual 15-kva. capacitors and 21 10-kva. units. They are located at each starter on loads of 30 horsepower or more and at each individual circuit breaker on the main breaker panel boards, in parallel with the loads; in both production areas and the boiler house. Here are the results:

. . . *Power factor* has been boosted to 96% lagging, from a hard-on-the-power bill 73% before correction. Which would undoubtedly justify the installation in itself. But more interesting is this point:

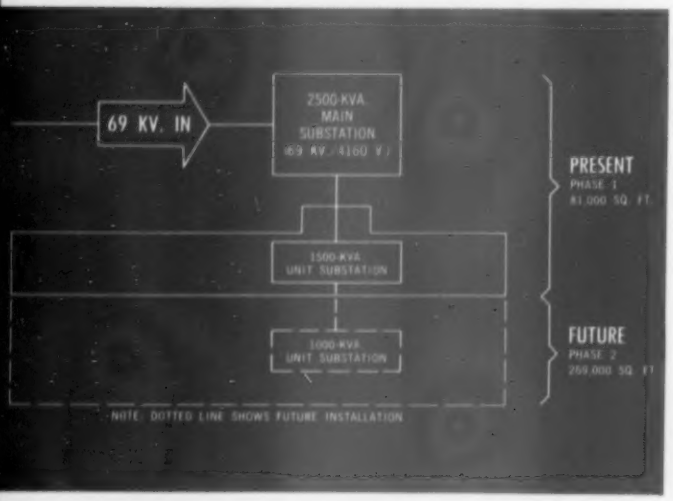
. . . *Equipment downtime* caused by momentary power failures have been cut by the capacitor installation. As is probably the case almost everywhere, the plant experiences an occasional voltage drop—of 10-cycle or so duration—as a result of electrical storms. Magnetic-type starters would normally "drop out" or open the circuit in such cases.

The capacitors, however, supply a momentary increase of voltage that prevents these drop-outs when the voltage dips for a fraction of a second.

While a capacitor's "storage capacity" is an everyday concept in electronics, we seldom consider using—as Central Soya has done—power-factor-correcting capacitors to store up power for release when line voltages drop.

(For more details on this interesting and unusual plant—which wins one of FACTORY's General Awards—see pages B-2 through B-5.)

Central Soya Company, Inc., and McMillen Feed Mills (Feed Manufacturing Division), Chattanooga.

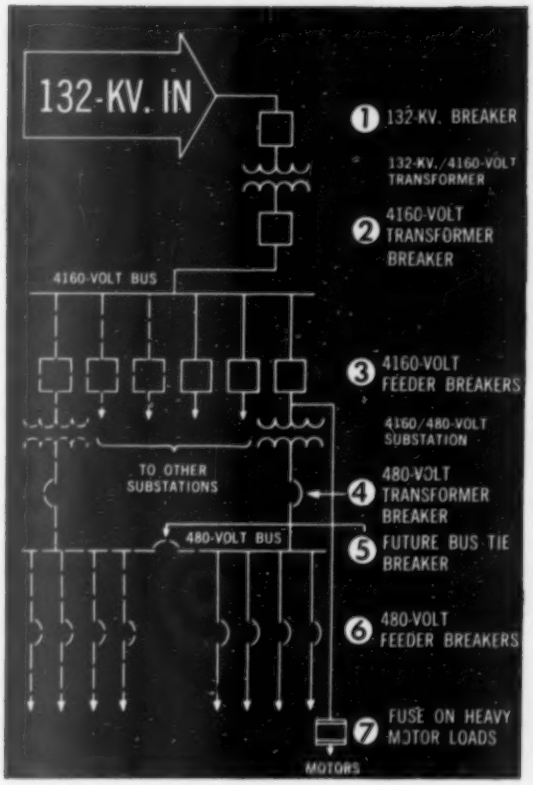


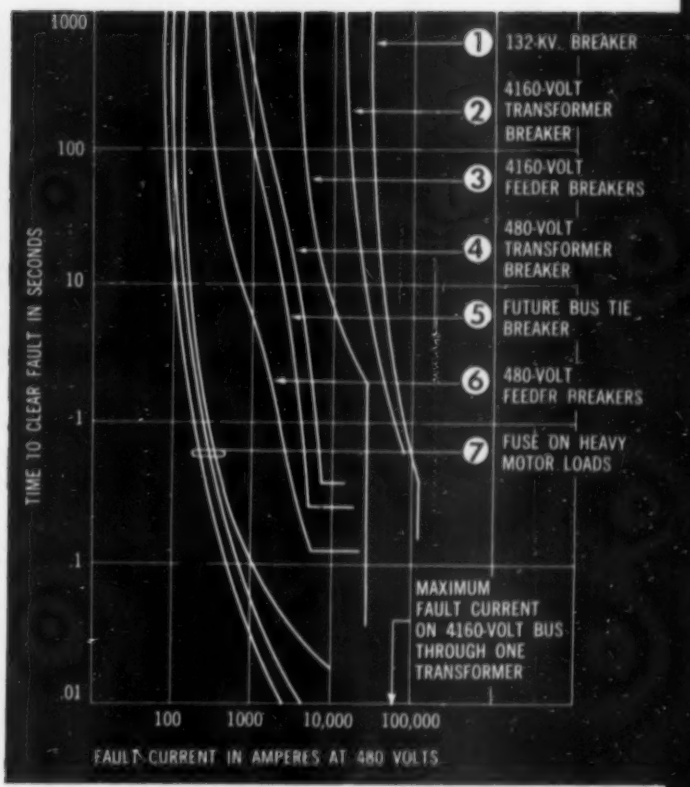
No Bars to Growth Here

When engineers of Townsend Company plan ahead, they mean business. This year the company completed the 81,000-sq.-ft. first phase of its new plant. The second phase will be 269,000 square feet. Looking ahead electrically, the company installed a 2500-kva. main substation which, it is expected, will have enough capacity to service the entire ultimate plant. And it has four times the capacity needed to handle the present 800-kva. demand.

The existing unit substation has a 1500-kva. capacity, more than twice present needs. It has four 400-amp. spare breakers, which will be used in the first phases of future expansion. And before the increasing load catches up with the now-spare 700 kva. of capacity in the present unit substation, a new 1000-kva. unit will be installed.

Townsend Company, Ellwood City, Pa.





CORRECT PROTECTION for circuit at left is shown in time vs. fault-current curves at right. Vertical line through any value of fault current shows that protective devices operate in proper order: first, breaker nearest any fault, then—in order—other breakers in direction of incoming power source. Result: Minimum of load is cut off.

Right Kind of Relaying Means Less Downtime

And that's just the aim of the selectively coordinated system diagrammed above. It's the system at Silicones Division, Union Carbide and Carbon Corporation. It's designed to insure that an absolute minimum of protective devices will open to isolate any fault—thus minimizing the amount of production equipment put out of action by the fault. Take the following case example:

Suppose a piece of utilization equipment connected to a 480-volt feeder has a fault. Ideally, only the feeder breaker (No. 6 on the diagram at left) on that load's feeder will open, removing the fault from the system. But unless the relay controlling the opening of the 480-volt transformer breaker (No. 4 on the diagram) is set just right, the fault on the load may cause this breaker (No. 4) to open *before* the feeder breaker (No. 6). Which would isolate not only the faulted load, but all loads fed by the 480-volt bus—causing a considerable amount of needless downtime.

The curves on the right, above, show the time in seconds after fault at which each of the protective devices in the system will open—for every value of fault current. By drawing a vertical line through any value of fault current, you'll find that the breakers will operate in this order: First, the breaker (or in the case of motors, fuse) nearest the load; then—in order—subsequent breakers away from the fault, toward the incoming power source.

Should the breaker closest to the fault fail to operate as it should, notice that there's a time interval before the next device in line operates. This interval is timed to be long enough to allow positive functioning of the "first-in-line" device, yet short enough to prevent damage to equipment or hazard to personnel before the next-in-line device functions.

For more details on the methods of coordinating relays—and the benefits—see FACTORY, December 1955, p. 118, for article entitled: "Are Your Relays Working Right?"

Silicones Division, Union Carbide and Carbon Corporation, Long Reach, W. Va.

Pushbutton Machine Control

That's what Garden State's new plant has. Right within the superintendent's reach. This built-in IBM Central Control unit can be rigged to start or stop any piece of equipment in the plant, at any predetermined time.

Operation is simple—and no special control wiring is needed. Command signals of various frequencies are superimposed on the 60-cycle current carried by the plant's normal wiring. These electronic pulses trip coded relays (there's a separate command-signal frequency for each relay) that turn on or off motor switches, magnetic switches, motorized valves, lighting circuits, and the like.

There are 40 circuits available in Garden State's standard unit, though at present only six are in use. They program control of shift signals, time clocks, outside night lighting, enameling oven (for pre-heating ahead of shift time) and centerless grinders (which get a half-hour warm-up ahead of shift time).

In the future, Garden State plans to utilize its system more fully; to control automatic production equipment, pumps, compressors, exhaust fans and—in the words of a company executive—"any of a million and one things that you tend to forget when you leave them up to watchmen or other humans."

What are the advantages of the system? They all stem from the fact that the system can control the operation of any equiment at any time—automatically. Watchmen needn't be distracted from their normal duties to start up equipment ahead of shift, or perform other off-hour services—a practice frowned upon by many fire-protection agencies. A reduction in labor costs—fewer men would be needed to perform these off-hour services—can be expected. And the precise control provided by the system should save power usage, equipment running time. **Garden State Mower Company, Division of U. S. Hammered Piston Ring Co., New Providence, N. J.**

Pushbutton Stenographer Pool

Credit savings of $30,000 a year to a built-in communications service in the brand-new plant of G-E's Specialty Control Department, at Waynesboro, Va. It lets note-, speech-, memo-, and letter-writers dictate from any of 130 plant stations. Assures fast (2-hour average) delivery of transcription.

It replaces an old system that included a secretary assigned to a group of dictaters, plus a central transcribing bureau using portable recorders.

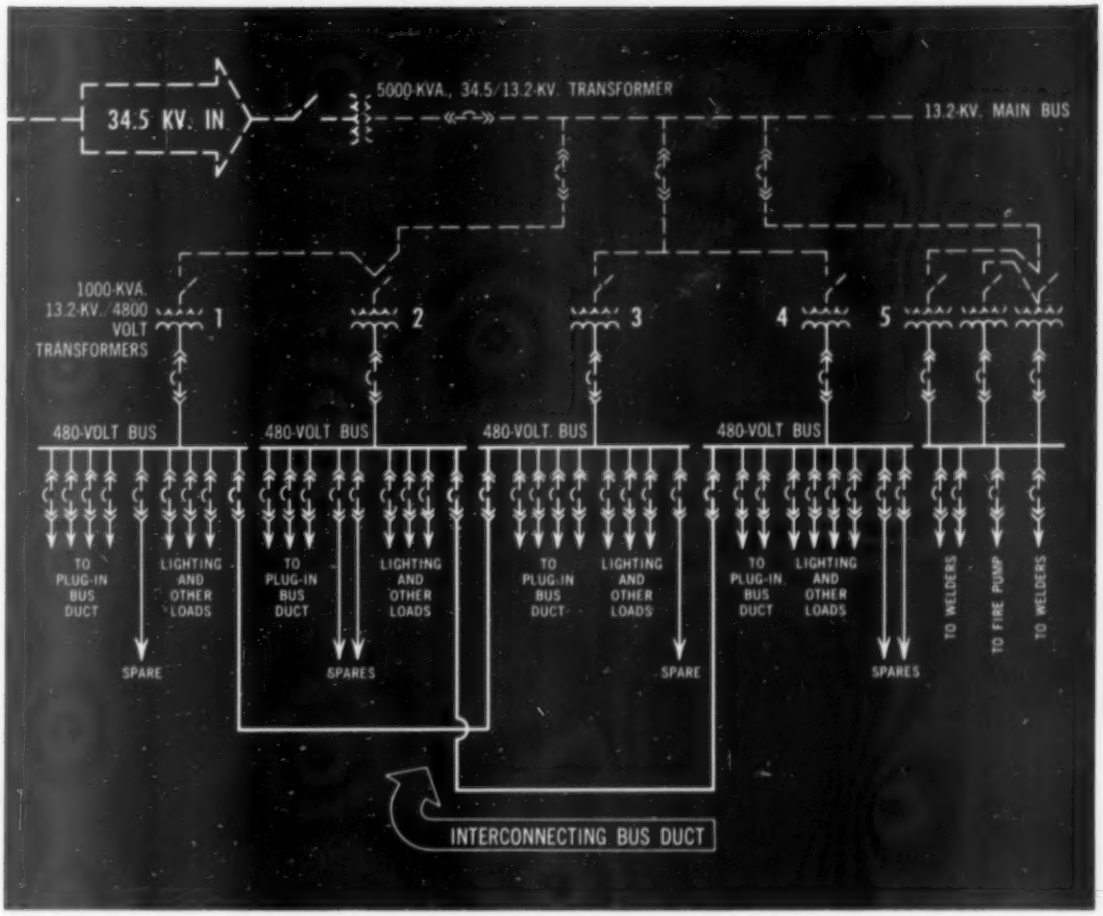
The new system uses the regular plant telephone system, standard dial telephones (modified by the substitution of a handset with a start-stop pushbutton), six Dictaphone recorders in a central transcribing room, and typists—four full-time with part-time assistance from two others.

Anyone wishing to dictate dials digit 7 for a free recorder, gets a single "beep" when he's got one. From then on, he dials single digits to control his recorder—4 for a correction, 8 to mark the end of a letter, 6 to get a playback, 0 to talk to attendant. To release his recorder, he hangs up.

The system automatically signals a faulty recorder, the end of the recording belt, any other obstacle to dictation.

Gains? They're substantial. The same desk instrument is used for inter-office voice communication and dictating (dialing when dictating affects the recorder only, not the plant telephone system). Workload changes can be handled easily—if more recorders are needed, they can be added off the central switchboard. Up to 10 can be connected to a single selector level at the switchboard.

The system is flexible—changes in station location require only relatively simple reconnection. **Specialty Control Department, General Electric Company, Waynesboro, Va.**



RELIABILITY INSURANCE can be seen quickly here. Interconnecting bus (at bottom of diagram) connects 480-volt bus runs, so that most of the load of any faulted transformer can be carried by its "mate."

Reliable Power — at Low Cost

That's what G-E's General Purpose Control Department got by using the simple system shown above. As you can see, the secondary (480-volt) sides of substations 1 and 3 are connected with an interconnecting bus. So are the secondaries of substations 2 and 4. This means that should any of these four transformers fail, at least the important part of its load can be carried by the transformer with which it's tied. (Substations are now loaded to about 70% of capacity. Thus, by cutting non-essential loads on both the faulted transformer and its mate, all essential loads can easily be carried while the faulted transformer is repaired or replaced.)

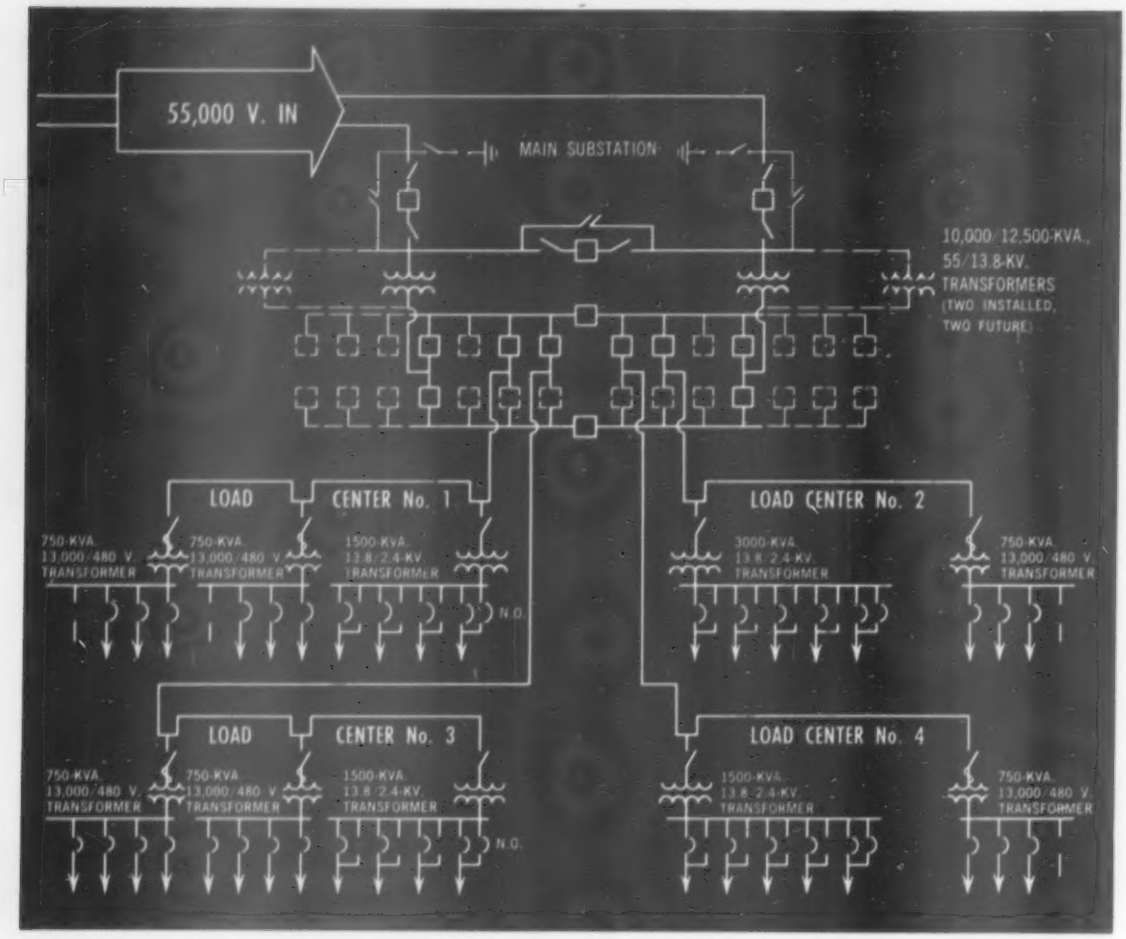
Why aren't all five interconnected? By connecting all five substations on the secondary side, G-E would have got maximum reliability. But by connecting them in pairs, the chance of downtime is cut in half. Company officials felt that the probability of both substations in a pair (each fed by a separate 13.2-kv. feeder, incidentally) failing was not great enough to justify the added expense of additional interconnecting bus duct.

And substation 5, which is not tied to any other, is made up of three transformers, any two of which could carry most of the load of the 480-volt bus it serves. The line to the fire pump is a direct one, running underground, and is protected.

How system works—Incoming power is supplied to the 5000-kva. main substation at 34,500 volts. It is transformed to 13,200 volts, is distributed at this voltage to the five unit substations in the plant. There, voltage is stepped down to 480 volts. Substations 1 through 4 feed runs of 400-amp. plug-in bus-duct, on 60-ft. centers. The fifth supplies power for welding and the fire pump. The lighting is 277-volt fluorescent fed directly from the 480-volt line. Two 200-hp. synchronous motors that drive the air compressor boost power factor.

General Purpose Control Department, General Electric Company, Bloomington, Ill.

C



NO LACK OF spare capacity in this system. And provision to carry twice the load. With no growing pains. Two separate 55-kv. lines normally share the load, but if either fails, load is automatically switched to the other.

No Expansion Problems Here

When Shell Oil Company engineers designed the electrical distribution system for the new Anacortes (Wash.) refinery, they took no chances on its ever getting in the way of plant expansion. Here's how:

. . . *For an initial connected load* of 10,700 kva. and an expected average demand of 7000 kva., 20,000 kva. of main substation transformer capacity was installed. Thus, installed transformers are now loaded to less than one-half capacity—without forced cooling. And there's provision for two future transformers (see diagram) that will probably be installed when the average load reaches the forced-air rating (i.e., 12,500 kva.) of one transformer.

. . . *Equipment for expansion* of the system into all undeveloped space on the site can simply be tied into the existing system. No modification of the existing system—except for adjustment in relay settings, current-transformer ratios, etc.—will be required.

As a general rule, Shell engineers expect expansion to take the form of additional load centers such as those shown above. (Note that there are plenty of spare positions for 13.8-kv. switchgear to serve the future substations. And of course there's plenty of main substation capacity.)

Expansion may also take the form of additional transformers at the existing load centers, fed by either existing or new feeders. And 1500-kva. transformers can be replaced with 3000-kva. units—they're interchangeable.

. . . *Not less than one-third* of the ducts in any conduit bank are spares. And all manholes are sized for the installation of an additional 9- to 12-duct bank. Thus future cable installations will involve no costly installation of duct around sewers, drains, or underground piping.

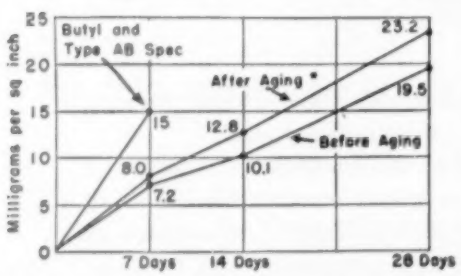
Shell Oil Company, Anacortes, Wash.

Amazing moisture resistance of Anaconda's Type AB butyl high-voltage insulation helps reduce failure due to moisture.

When you can't keep cable out of moisture

New insulation keeps moisture out of cable

Exceptional moisture resistance is provided by Anaconda Type AB butyl insulation.



RESULTS OF mechanical moisture absorption test show Type AB retains good moisture resistance even after aging.

Where rubber-type cable is installed in underground ducts or buried directly in the earth, the moisture-resistance properties of the *insulation* are vitally important.

Latest facts show *Anaconda's Type AB butyl high-voltage insulation absorbs far less moisture* than industry standards permit. For the mechanical moisture absorption test, the industry has regarded 15 milligrams increase in weight per square inch of exposed surface, after 7 days' immersion at 70C, as a criterion for satisfactory moisture resistance. Type AB easily meets that requirement—in fact, typical results show it absorbs less than 7.2 mg. in 7 days.

New Engineering Bulletin EB-27 gives you full details on performance of Type AB insulation in 15 Industry Specification tests. Ask the Man from Anaconda for your copy. Or write: Anaconda Wire & Cable Company, 25 Broadway, New York 4, N. Y.

Get all the facts on Anaconda butyl. Write today—

ASK THE MAN FROM ANACONDA®

—PIONEER IN BUTYL INSULATION

Allis-Chalmers offers a complete line of

MOTOR CONTROL

Small ... Large *and* all sizes in between

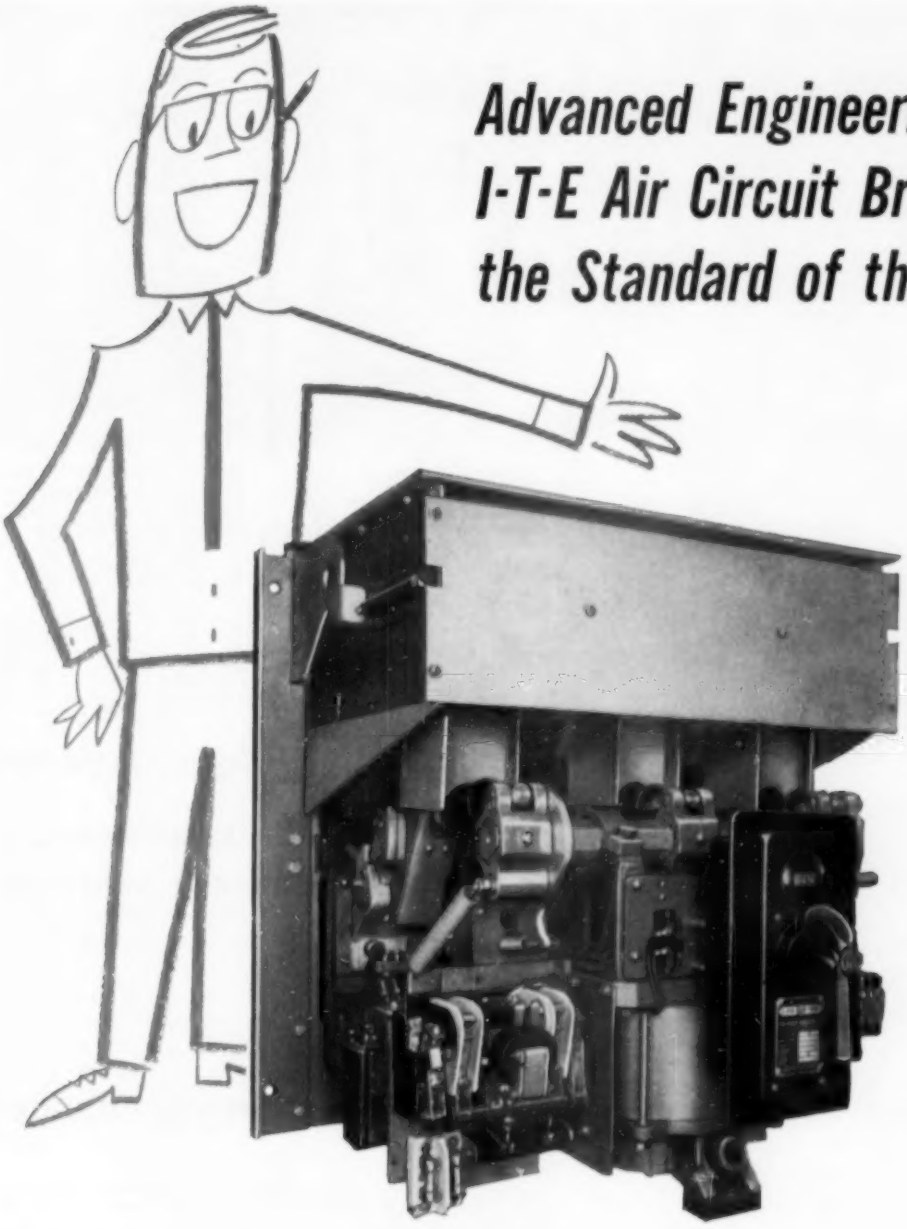
The Allis-Chalmers line extends from small manual starters for fractional horsepower motors through starters applied in controlling up to 2500-horsepower motors. Built into every control is the type and degree of protection required to meet your specific needs. Control functions, varying with application, include full or reduced voltage starting, acceleration, speed control, reversing or non-reversing, and dynamic braking.

Application Help

An Allis-Chalmers recommendation is backed by the experience gained in solving thousands of control application problems . . . by complete research and testing facilities. Get all the facts. See your A-C representative or write Allis-Chalmers, Milwaukee 1, Wisconsin.

A-4722

ALLIS-CHALMERS



Advanced Engineering Makes I-T-E Air Circuit Breakers the Standard of the Industry

New design extends K line through 4000 amp continuous and 150,000 amp interrupting capacity

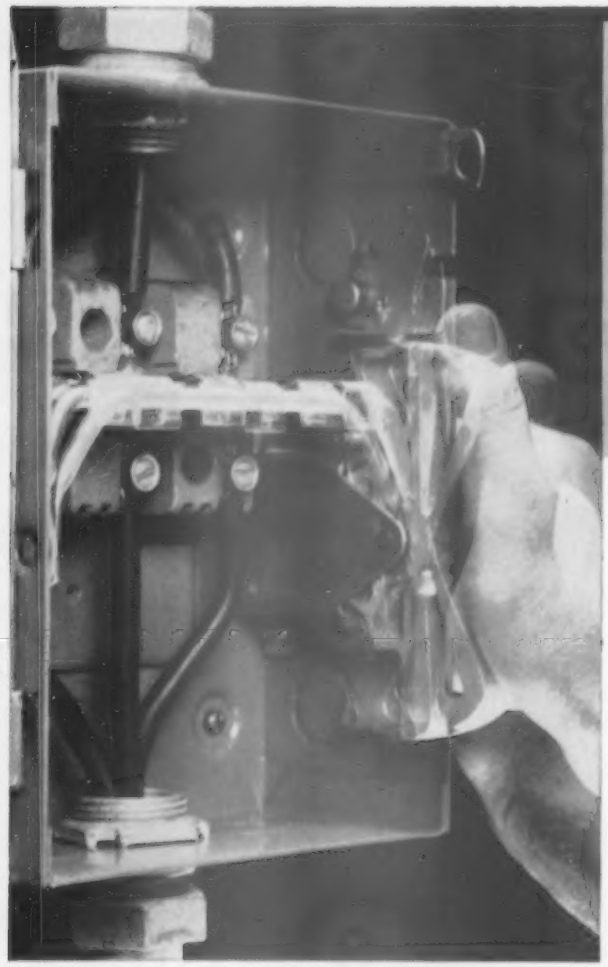
Here are some of the extra features that make the new K line of I-T-E circuit breakers the standard of the industry:

- Compact arc chutes designed to provide fast, efficient arc interruption
- Contact structure utilizing silver-alloy, wiping action, sturdy construction and blow-on arrangements to assure superior interrupting ability, and long life
- Dual magnetic overcurrent trip, dual selective overcurrent trip, and other auxiliary devices
- Standardized location of all tripping devices, solenoid relays, auxiliary switches and terminal blocks

For the complete story of I-T-E superiority, contact your local I-T-E representative. Or write for Bulletin 6004B, I-T-E Circuit Breaker Company, 19th and Hamilton Sts., Phila. 30, Pa.

I-T-E

I-T-E CIRCUIT BREAKER COMPANY • Switchgear Division



The positive arc-restricting switching action of BullDog's Clampmatic Vacu-Break Safety Switches is shown in the above demonstration photo of the switch interior. In all normal operation, the switch box door is closed.

MASTER CLAMPMATIC VACU-BREAK, unequaled quality and high performance. Acts as disconnect or service entrance switch. Fills applications up to 1200 amps.

JUNIOR CLAMPMATIC VACU-BREAK, deluxe general-purpose switch at an exceptionally low price. The complete line ranges in ratings from 30 amps to 600 amps.

Switch with Security!

GET BULLDOG CLAMPMATIC VACU-BREAK SAFETY SWITCHES

Greater safety . . . longer life . . . no costly maintenance!

BullDog Safety Switches bring you real extras – in safety, in performance, in longer life. The two types shown – Master and Junior – cover a wide range of applications, meeting your needs with greater efficiency.

They feature these *Big 3* BullDog exclusives: (1) Vacu-Break® arc control, (2) Clampmatic® action, and (3) dependable switch mechanism.

The Vacu-Break control smothers arcs, minimizes pitting and burning. The Clampmatic action provides bolt-tight contact pressure. The BullDog switch mechanism *guarantees* positive switching security.

You'll find it's a switch to economy when you switch to BullDog Safety Switches. Consult your qualified electrical contractor or BullDog field engineer, or write BullDog Electric Products Co., Detroit 32, Mich.

© BEPCO

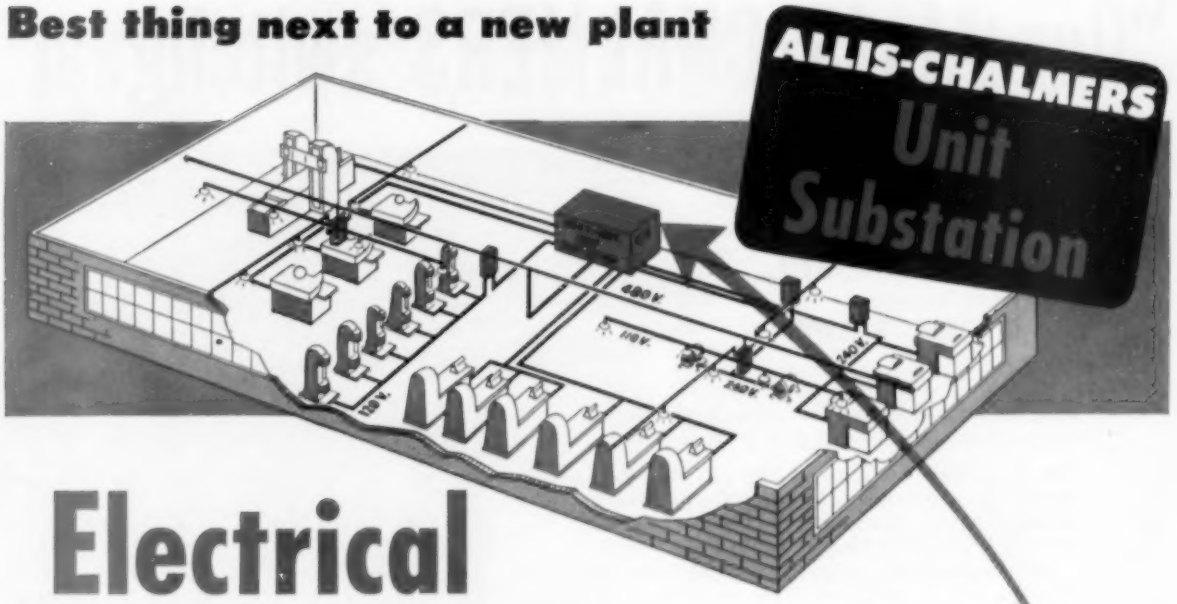
IF IT'S NEW... IF IT'S DIFFERENT... IF IT'S BETTER... IT'S **BULLDOG**

ELECTRIC PRODUCTS COMPANY

A Division of I-T-E Circuit Breaker Company

Export Division: 13 East 40th Street, New York 16, N. Y. • *In Canada:* BullDog Electric Products Co. (Canada) Ltd., 80 Clayson Road, Toronto 15, Ont.

Best thing next to a new plant



Electrical Modernization pays off in lower operating costs, increased profits

No Space Problem

Mount Allis-Chalmers unit substations anywhere. Tuck them into a corner of the production floor, mount them on balconies, in the basement, or any available space. They are flexible and compact. Metal enclosures eliminate need for vaults and provide attractive appearance.

There's a low-cost way of solving the problem of an outdated electrical system.

When voltages are low you lose in machine and operator effectiveness. Dim lighting hampers inspection and assembly. Worst of all, you're in no position to take advantage of new machinery developments or changes in plant layout to improve efficiency because every change means complicated, expensive re-wiring.

Allis-Chalmers unit substations distribute full power at the center of the load. Voltage drop and conductor losses are kept to a minimum. Secondary wire to machines is shorter and less expensive.

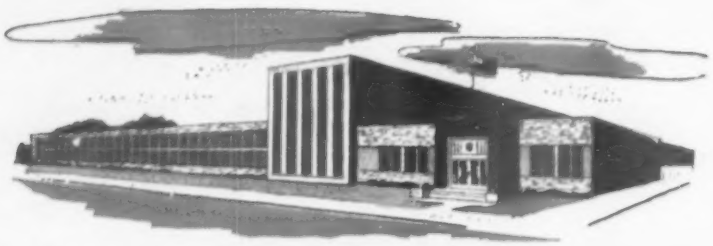
Allis-Chalmers experienced substation engineers will help improve your plant's electrical system. Call your nearby A-C district office for help. Or write Allis-Chalmers, Power Equipment Division, Milwaukee 1, Wisconsin, for your copy of "Power at Load Centers Pays Off." A-4886

ALLIS-CHALMERS

"Our ALLIS-CHALMERS switchgear

Says:

HENRY KLINGBEIL,
Plant Engineer
GIDDINGS & LEWIS



And he should know! He helped with the planning and he was on hand during the installation.

The problem: to tear out the old switchgear, install three new switchgear lineups plus one control lineup — and have the plant ready to go when the two-week vacation shutdown was over.

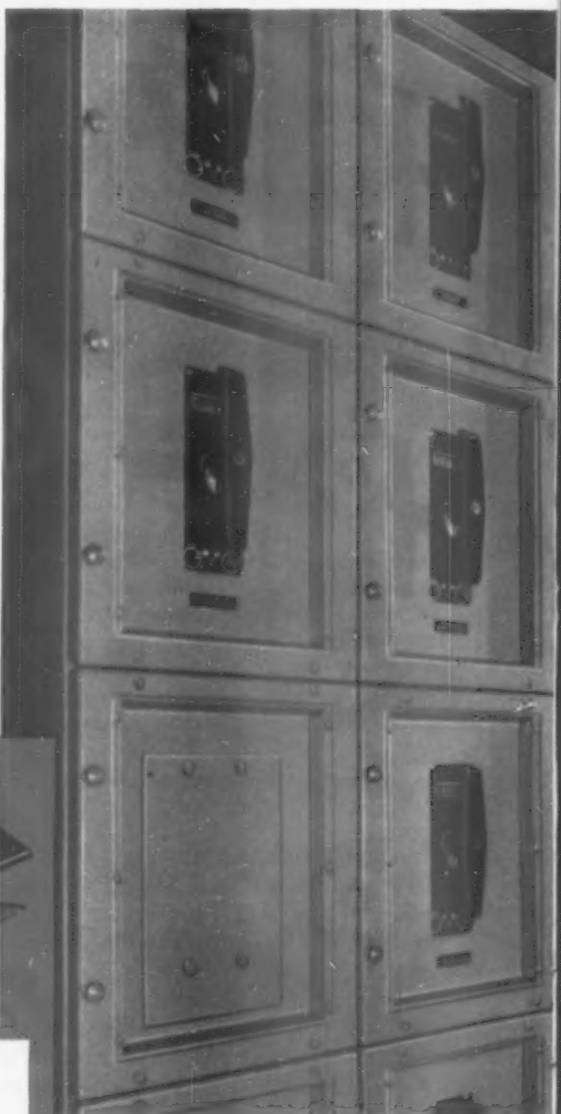
Months of careful planning and scheduling went into the job. In addition, these features of Allis-Chalmers Switchgear helped Giddings & Lewis, and their contractor, meet this tight schedule:

- Special arrangements for jacking structure.
- Jig-built stationary and removable elements that assure interchangeability.
- Swing-out type potheads to simplify cable connections.
- Dry-type bus joints eliminate compounds.
- Open-ended bus compartment that makes it possible to slide cubicles into place without lifting them over the floor cable.

Perhaps you have an electrical modernization problem and must think in terms of fast changeover.

If so, Allis-Chalmers has two things to offer: (1) Switchgear features that make installation fast and easy; and (2) close cooperation at every stage of the job.

Call your nearby Allis-Chalmers office early in the planning stage. Or write Allis-Chalmers, Power Equipment Division, Milwaukee 1, Wis.



Cubicles were placed on rollers and moved into place at Giddings & Lewis. Here is simple jacking arrangement that makes lifting cubicles easy.

This dry-type bus joint, originated by A-C, speeds the job, allows expansion or contraction of bus. There's no fuss, no muss, no messy compounds.

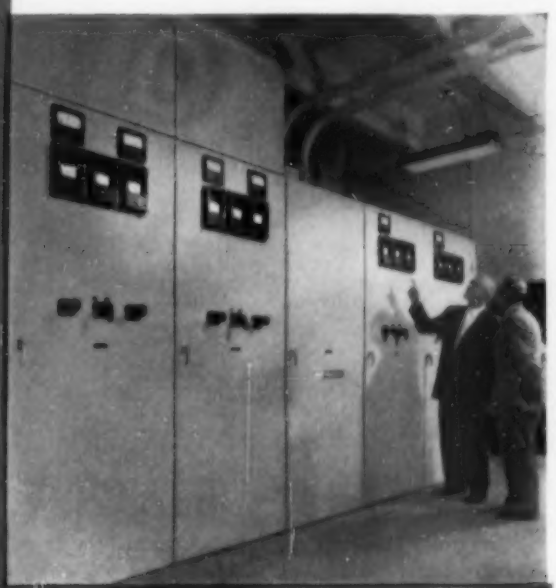
ALLIS-

went in fast, without a hitch..."

Giddings & Lewis had floor cable in place before switchgear arrived, as in photo at left.

Placing Allis-Chalmers switchgear over floor cable, as in photo at left, is a simple operation. It can be done without lifting cubicles. Rear of cubicle has no cross member at floor line, switchgear can be slid into place.

Below, completed installation is being checked by Allis-Chalmers representative, John Gerber, and Henry Klingbeil of Giddings & Lewis.



Modern factory-built unit replaced piecemeal arrangement. Since the whole installation is factory engineered and assembled, this in itself speeds installation.

A-4891

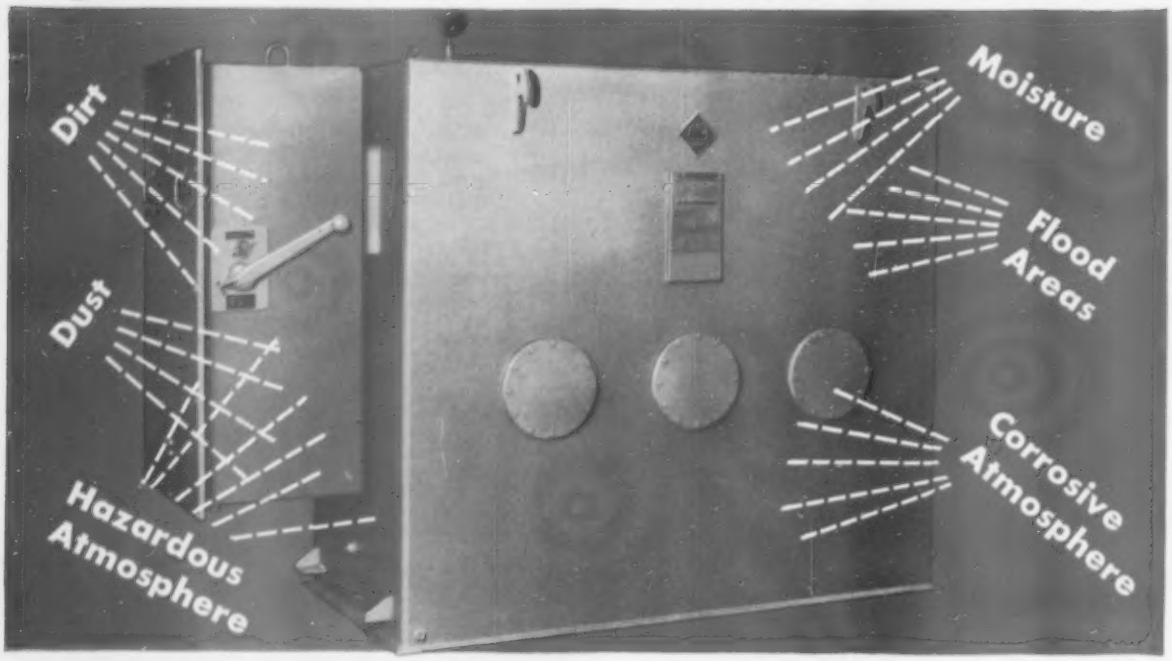
CHALMERS

A-C ALLIS-CHALMERS

Get booklets on the All-New Allis-Chalmers Low Voltage Switchgear. Ask for Bulletins 1888252 and 1888283.

ALLIS-CHALMERS
Sealed
Dry-Type
Transformers

Designed for the *Toughest Spot* In Your Plant



SAFE in any location regardless of Atmosphere or Moisture Conditions

Here's a transformer you can safely install anyplace without worries.

● **Fire or Explosion Hazard Eliminated** — Unit is hermetically sealed in inert-dry-nitrogen atmosphere.

● **Completely Protected**—Can be placed safely in flood areas, dirty and contaminated atmospheres, or in open work areas without vaults or barriers.

● **Insulation Life Increased** — Core and coil assembly is sealed in inert gas. Eliminating oxidation reduces thermal aging of insulation.

● **Maintenance Requirements Cut** — Elimination of cooling tubes and use of smooth tank surface reduce paint area as much as 60%. No internal liquids to maintain. All-welded construction. Number of gasketed openings reduced. Cleaning of core and coil eliminated. For these reasons, unit can be installed in hard-to-get-to places.

● **Low Installation Cost** — Unit is ready to be energized immediately upon delivery, after check to make certain no damage or leaks have occurred during shipment.

Allis-Chalmers transformers have an outstanding record of satisfying thousands of users all over the country. You can get the complete story on Allis-Chalmers sealed dry-type transformers from your local A-C office, or write Allis-Chalmers, Power Equipment Division, Milwaukee 1, Wisconsin.

A-C ALLIS-CHALMERS

A-5035

NEW! **Heavy-duty relay in small space**

This new CLARK Type "PM" Control Relay introduces a new concept in relay design: *Sectional Pole Construction.*

In this new relay, each pole is contained in its own melamine housing, and any individual pole can be removed or replaced from the front without disturbing the others. A short circuit is confined to a single pole and will not destroy the whole relay. Wiring terminals are on the front, and all maintenance including coil changing, pole or magnet replacement, is also from the front—without removing relay from panel. Contacts are quickly and easily convertible from normally open to normally closed and vice versa—from the front. Range of models provides relays with 2 to 12 poles. Exclusive design allows more contacts per square foot of panel space. In addition to the many advantages of SECTIONAL POLE CONSTRUCTION, you get a *heavy-duty relay in small space.*

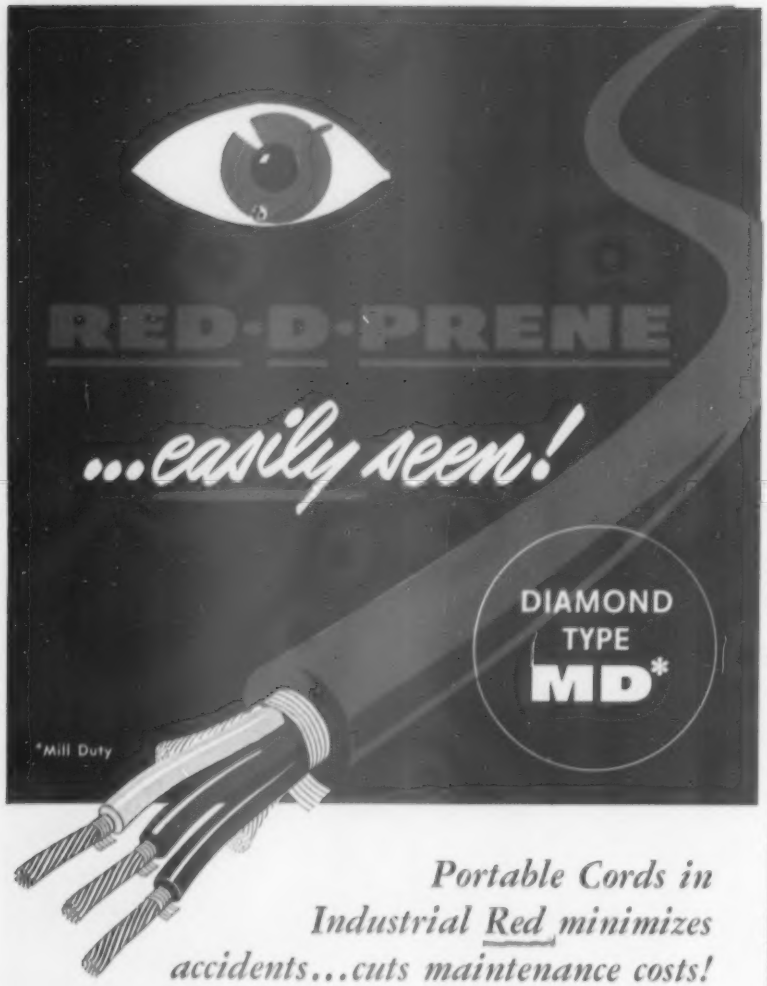
For complete information write to

The CLARK CONTROLLER *Company*

Engineered Electrical Control

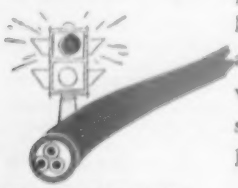
5146 East 153rd Street • • Cleveland 10, Ohio

IN CANADA... CANADIAN CONTROLLERS, LIMITED • MAIN OFFICES AND PLANT, TORONTO



Portable Cords in Industrial Red minimizes accidents...cuts maintenance costs!

No flat sides, no off center conditions. Gives maximum flexibility, is moisture resistant.



Industrial Red sheath provides maximum visibility for absolute identification.

For positive identification — in your stockroom or inside and outside the plant by maintenance men—Type MD RED-D-PRENE is your safe choice! First designed with a tough, oil-resistant Neoprene sheath (in Industrial Red). Assures long wear, materially reduces maintenance costs. Carries current where you want it, safely and at lower cost. Outstanding for heavy duty use in Mill and Plant installations.

Without delay : : : write for our new descriptive brochure and samples!

Trade Mark

DIAMOND WIRE & CABLE CO.

SYCAMORE, ILLINOIS

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Buildings and Grounds ..... p. B-30
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(See also Part 1, page 120)

59—Cable and Tube Raceways. Here's the story on "Globetray," engineered for uniform design and easy installation. Illustrated are straight sections and covers, universal splice plate, horizontal fittings, vertical fittings, and accessory items. 8 pages. *Globe Co.*

60—Motor Controls. Spiral-bound Catalog 101 covers many kinds of magnetic starters, magnetic contactors, magnetic relays, pump controls, control panels, pushbuttons, switches. Well-illustrated with photos, diagrams, and helpful tables. 138 pages. *Furnas Electric Co.*

61—Electrical Tables. Two bulletins are offered. One presents a general line; contains application photos and technical data. The other presents a plastic tape, an insulation material for control equipment—from pushbuttons to panelboards. *Permacel Tape Corp.*

62—Electrical Specialties. Catalog 84 describes and illustrates many types and models of switches, lampholders, and lamp guards. Contains detailed specs and cutaway views. Parts and accessories. 48 pages. *McGill Mfg. Co.*

63—Switches. Catalog 83a features enclosed types. Among those described are limit, explosion-proof, splash-proof, high capacity, general purpose, double-pole, double throw, maintained - contact, pushbutton (hand), and hand-operated switches. 28 pages. *Micro Switch.*

64—Cable. Bulletin 1090 tells how a rubber-insulated cable with interlocked armor over-all is easily installed, re-routed; provides flexible,

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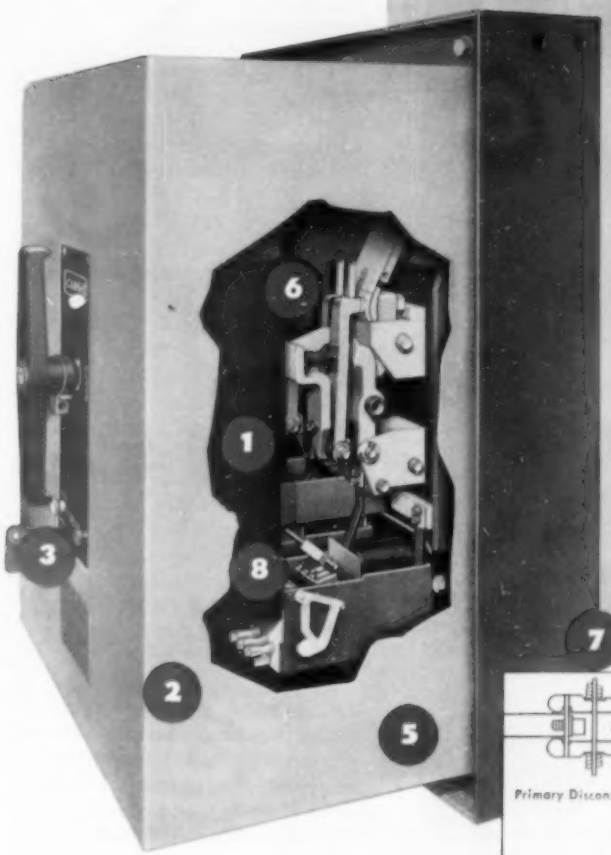
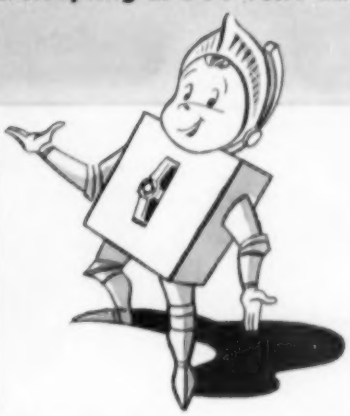
ALLIS-CHALMERS

Individually Enclosed

Low Voltage Breakers

For service to 600 volts ac, 1600 amp continuous; 50,000 RMS amperes interrupting at 600 volts ac.





1. Dead front—Even with enclosure cover removed, breaker is entirely safe.

2. Accessible — Deep, removable front cover permits easy inspection and maintenance from both sides and front.

3. More safety — Interlock prevents removal of cover while breaker is in closed position.

4. Pull-out construction—Easy removal of breaker without disconnection of cables. Access to cable connections through entire front opening.

5. Weather-proof or dust-tight as well as standard, general purpose enclosures are available.

6. Long life contacts — Blow-on type action means high contact pressure — no bounce — less erosion.

7. Positive high pressure connection provided by compression springs on primary disconnects.

8. Accurate time-delay control provided by hermetically sealed, positive displacement trip device.

Get More Information — Contact your nearby A-C office, or write Allis-Chalmers, Power Equipment Division, Milwaukee 1, Wisconsin, for Bulletins 18B8252 and 18B8283.

ALLIS-CHALMERS

A-4932

NEW Furnas Electric SIZE 4
MAGNETIC CONTROL

Rated for
50 HP 220 volts
100 HP 440 volts

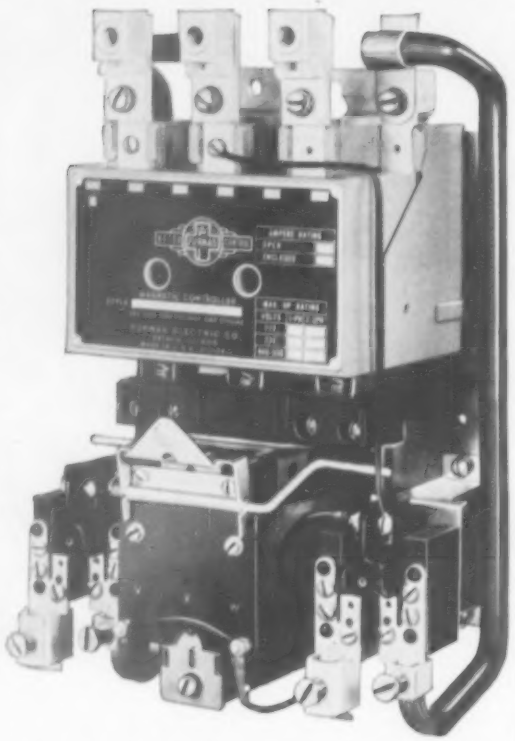
Arc Box Cover Easily Removed To Inspect Contacts

Dual Voltage Magnet Coil

All Contacts Are Easy To Replace. No Wires To Remove

Contacts Are Locked In Open Position When Reset Button Is Operated

Switchlets Easily Attached For Additional Circuits



COMPACT—STANDARD DESIGN—DUAL PURPOSE

Years of engineering and field testing are built into the Furnas Electric size 4 magnetic starter. Compare these features: COMPACT—The new size 4 starter is only slightly larger than the size 3. STANDARDIZED DESIGN—Non-current carrying elements such as magnet assembly, arc box, cross arm, mounting plate and the like are interchangeable with the size 3. This standardization has been made without compromising on life because larger contact and other current carrying parts provide the increased capacity. DUAL PURPOSE—Reconnectable dual voltage coils. A single starter stocked with its coil connected for 220 volts can be quickly and easily reconnected for 440 volts. Coil changing is eliminated and stocking of starters and coils simplified.
Write for Bulletin 5604, Furnas Electric Company, 1032 McKee Street, Batavia, Illinois

FURNAS ELECTRIC COMPANY
BATAVIA, ILLINOIS
SALES REPRESENTATIVES IN ALL PRINCIPAL CITIES

FACTORY / CATALOG NEWS
Begins on page C-32

To get these catalogs, circle item numbers on the Reader Service card next to back cover.

compact construction. Data on construction components, splicing and terminating; engineering. 32 pages. *Okonite Co.*

65—Circuit Breaker Power Panels. Bulletin CBP-455 covers three lines. Describes circuit breakers used in these panels. Sections on features, dimensions of six frames, characteristics, dimensional and layout data, and suggested specs. 22 pages. *Bulldog Products Co.*

66—Conduit. Catalog No. 52 covers two types of fiber conduit: standard, for installation with concrete encasement; and "Nocrete," for installation without concrete encasement. Information on joining, tooling, fittings. Simple diagrams. 12 pages. *Orangeburg Mfg. Co.*

67—Electrical Products. Abridged Catalog No. 56 contains photos and descriptions of many types of plugs and receptacles, lighting equipment, circuit controls, conduit fittings, turbines, and turbo-generators. Has handy number index. 78 pages. *Pyle-National Co.*

68—Switchgear. Subject of Bulletin 6004B is a low-voltage, metal-enclosed, drawout type for indoors and outdoors. Details on design and construction, specifications and standard arrangements, standard frames, and specifications. 12 pages. *I-T-E Circuit Breaker Co.*

69—Trolley Busway System. Bulletin No. 50 describes "Feedrail 100"—what it is and what it does; features and advantages. Information on track sections, track accessories, trolleys, trolley accessories, installation planning. 32 pages. *Feedrail Corp.*

70—Switches and Panelboards. Product Selector includes application and installation data on service entrance equipment, safety switches, lighting and distribution panelboards. Load and circuit chart. 32 pages. *Clark Controller Co.*

Turn to page C-42

MICRO precision switches

...THEIR USE IS A PRINCIPLE OF GOOD DESIGN

Switches on valve operator are actuated by Cams "A" and "B" as the valve rotates in either direction.

Explosion-proof switches provide automatic control on valve operator

MICRO SWITCH explosion-proof switches were installed on the gas valve operator by the engineer of a Texas gas company to provide safe and automatic control.

Two switches were placed so that they may be operated by cams as the valve rotates in either direction. The switches control the gas supply and turn on indicating lights when the valve is turned to either extreme position by the pressure of natural gas which it contains. The valve-operator is electrically controlled but is powered by gas.

Double-pole, double-throw switches are used because each switch is required to perform two functions. When the valve reaches either limit, one of the switches is actuated to open or shut off the supply of gas and turn on a light on the control panel, which shows the position of the valve.

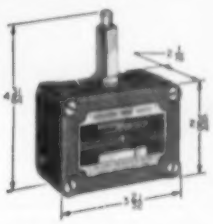
Explosion-proof switches are used to insure that no escaping gas will be ignited when electrical contact is made.

This installation is typical of thousands of such uses, which plant operating men, plant engineers, and maintenance superintendents are making of MICRO precision switches on present plant equipment. Production is increased by making machinery more automatic. Both operators and machines are protected when switches are used to prevent premature operation of equipment.

MICRO SWITCH Explosion-proof Switches (EX Series)

MICRO SWITCH "EX" Series of explosion-proof switches are listed by Underwriters' Laboratories for use in hazardous atmospheres of Class I, Group C (ethyl ether vapor) and Group D (gasoline, petroleum naphtha, alcohols, acetone, lacquer solvent vapors and natural gas); Class II, Group E (metal dust), Group F (carbon black, coal or coke dust), and Group G (grain dust)

This switch, which is shown in action in the gas company installation, is designed for cam or slide operation. The actuator arm is operated by clockwise rotation and is adjustable through 360°. Standard contact arrangement is single-pole, double-throw.



This push-rod plunger switch is designed for use as a limit switch on in-line motion applications. A stop ring near the plunger tip limits the overtravel and permits a steady load of as much as 100 pounds on the plunger without injury to the enclosed precision switch. Standard contact arrangement is single-pole, double-throw.

ELECTRICAL RATINGS

15 amperes 125, 250 or 460 volts a-c; ½ ampere 125 volts d-c; ¼ ampere 250 volts d-c.

Other explosion-proof switches in the MICRO "EX" Series include a cross roller lever switch for use where the operating mechanism approaches from a direction perpendicular to the longitudinal axis of the switch. The switch is also available with a large paddle-shaped actuator for manual control of power equipment.

Send for Catalog 101 "Switches for Industry"

MICRO SWITCH distributors are located in key cities everywhere. They have full stocks of switches for plant use applications. Look in the Yellow Pages under "Switches, Electric."

MICRO SWITCH

A DIVISION OF MINNEAPOLIS-HONEYWELL REGULATOR COMPANY

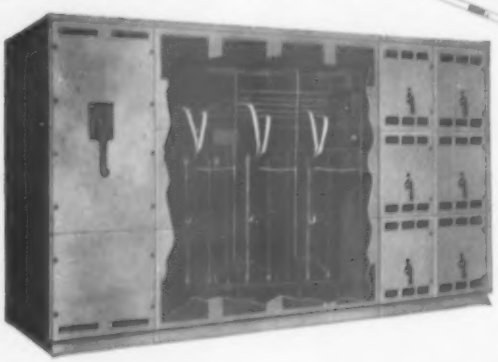
In Canada, Leaside, Toronto 17, Ontario • FREEPORT, ILLINOIS

Nothing is more important to your plant

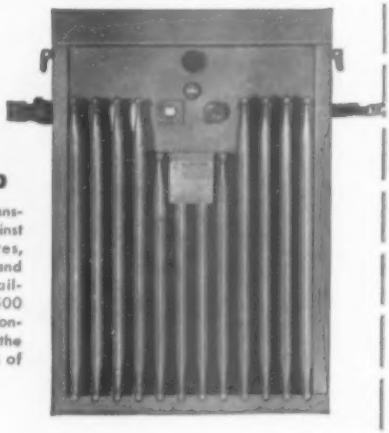
Wagner®
TRANSFORMERS
...the choice of leaders
in industry

WAGNER UNIT

are liberally designed



DRY TYPE (OPEN, VENTILATED)—For indoor use only. Normally installed in a dry, dust-free atmosphere in a well-ventilated location. Light in weight ... ideal for multi-storied buildings ... no fireproof vaults necessary.



CLOSE-COUPLED

These liquid-filled transformers fit flush against switchgear enclosures, eliminating throats and saving space ... available in ratings from 500 through 2000 kva. Connections are made at the bushings on the sides of the transformer.

OIL AND NOFLAMOL-FILLED

Oil-filled transformers are generally used outdoors. They can be used indoors if fireproof vaults are provided. Noflamol type in this model is filled with a non-inflammable liquid making it especially suitable for chemical plants, refineries and other locations where explosive liquids and gases are present.

NITROGEN-FILLED

These Class H Silicone Insulated Transformers offer many advantages in maintenance and safety. Suitable for indoor or outdoor use ... covers are welded to tank ... no cleaning problems, even in dust-filled areas ... completely fireproof. In ratings up to 2000 kva.

than an uninterrupted flow of power....

SUBSTATION TRANSFORMERS

to give years and years of service

The importance of the transformers in your plant power distribution system cannot be over-emphasized. If a switch or a circuit breaker fails, only a part of the system is affected—but if the *transformer* fails, the entire system is dead.

Think of the cost to your plant in terms of cancelled orders and lost manhours in the event your present system broke down.

Why not check up now on the adequacy of your transformers? If you find that new units or a new distribution system is in order—Wagner can supply you with substation transformers *predesigned* to meet your requirements.

Wagner *Predesigned* Transformers offer you the advantage of a proved design in a completely assembled transformer, tested at the Wagner factory. They are built in standard ratings *which are coordinated with the specifications of unit substation builders.*

You save time...

...save job engineering costs...

...and get full Wagner Quality with the switchgear of your choice.

Write for Bulletin TU-205. It gives full information on Wagner Unit Substation Transformers for industrial power distribution systems.

For portable tools, machines and lighting systems GET THE RIGHT VOLTAGE CLOSE TO THE LOAD with these WAGNER DRY-TYPE TRANSFORMERS!

Save money through shorter runs of copper, reduced line losses and lower installation expenses. These Wagner Dry-Type Transformers are compact, light in weight and safe to use. Good for use where ventilated transformers are impractical. No fireproof vaults or other enclosures necessary... install inside or out.

The 150° rise transformer is standard in ratings 3 through 10 kva and is also available through 50 kva. 55° rise model is standard in 1, 1½ and 2 kva and the 80° rise transformer is standard in ratings 15 through 100 kva. Write for Bulletin TU-57 for full details.

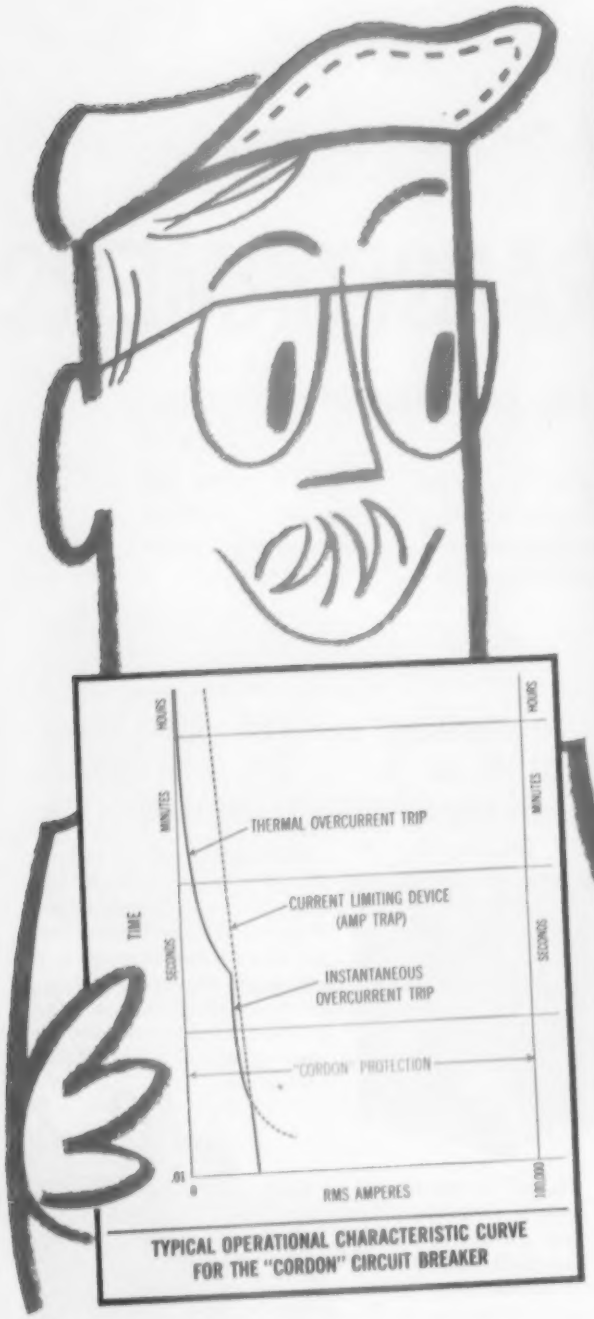
WAGNER ELECTRIC CORPORATION
6412 Plymouth Ave. • St. Louis 14, Mo., U. S. A.

Wagner Electric Corporation EST. 1891

ELECTRIC MOTORS • TRANSFORMERS • INDUSTRIAL BRAKES
AUTOMOTIVE BRAKE SYSTEMS — AIR AND HYDRAULIC

BRANCHES IN 32 PRINCIPAL CITIES

756-5



TYPICAL OPERATIONAL CHARACTERISTIC CURVE FOR THE "CORDON" CIRCUIT BREAKER

HOW IT WORKS: Combining and coordinating standard circuit breaker characteristics with specially designed current limiting Amp-traps, the "Cordon" circuit breaker achieves the characteristics shown above.

The thermal, magnetic trip unit provides coordinated protection against overloads and short circuits up to a predetermined value. At this point the current limiting Amp-traps assume the fault-clearing duty and extend short circuit protection to 100,000 rms amperes.

Therefore, unless the magnitude of a short circuit reaches the fusing point, the Amp-traps are unaffected, and the standard circuit breaker overload devices perform their normal function. Since the fast clearing time of the Amp-trap (less than ½ cycle) provides a current limiting effect, the magnetic and thermal stresses, which are proportional to the square of the current, are greatly reduced. Consequently, the standard molded case type circuit breaker safely withstands the heavy fault current, and the necessity of designing structures for maximum available short circuits is eliminated.

The Amp-traps are mounted in a molded housing which plugs into the load side of the breaker forming one compact unit. A design feature of the "Cordon" circuit breaker actuates a common tripper bar when any Amp-trap blows, opening all poles of the circuit breaker. Until the blown Amp-trap is replaced the circuit breaker cannot be closed. A mechanical linkage arrangement automatically opens the circuit breaker when the Amp-trap housing is removed.

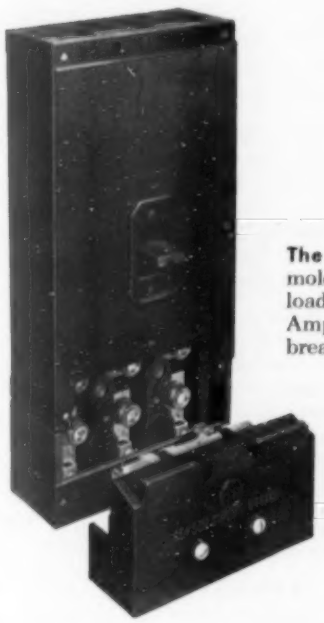
New I-T-E "CORDON" Circuit Breaker

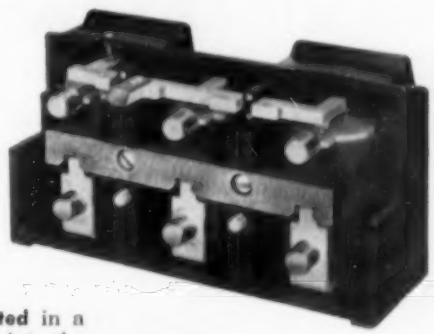
100,000 amp interrupting rating in molded case circuit breakers

Now—one compact circuit breaker provides the practical, economical solution to meet constantly increasing interrupting requirements. The new "Cordon" circuit breaker provides all of the design and operating advantages of the famed I-T-E molded case breaker, plus interrupting ability up to 100,000 rms amperes.

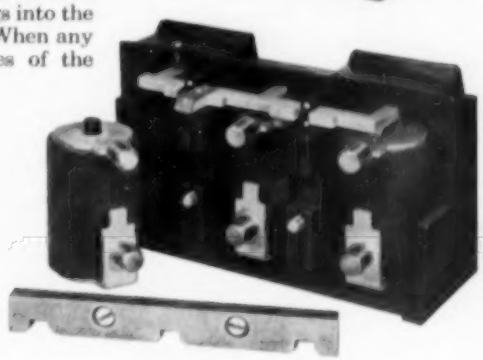
The "Cordon" circuit breaker can be utilized in normal branch and feeder circuit applications in switchboards, panelboards, load centers, and individual enclosures. Plug-in mounting, rear connected studs, or front connected terminal mounting arrangements are optional.

"Cordon" circuit breakers are available with 2 or 3-pole construction in 100, 225, 400 and 600 ampere frame sizes, 250 v d-c and 600 v a-c. Write for complete details or call your nearest I-T-E office. I-T-E Circuit Breaker Company, Small Air Circuit Breaker Division, 19th & Hamilton Sts., Phila. 30, Pa.





The Amp-traps are mounted in a molded housing which plugs into the load side of the breaker. When any Amp-trap blows, all poles of the breaker are opened.



Draw-out design feature of Amp-trap housing provides accessibility to simplify change of Amp-trap. Amp-trap stud design assures proper alignment and positive connection when inserted in the breaker frame.

To replace a blown Amp-trap (indicated by released plunger) you simply loosen two screws, remove the retaining bar, withdraw the blown unit, insert the new one, and replace the retaining bar.

I-T-E CIRCUIT BREAKER COMPANY

Small Air Circuit Breaker Division

Want Help in Planning a New Plant?

Or upgrading the one you have? Then here's help. In handy reprint form. 21 articles that have already proved their worth to FACTORY's readers.

WOULDN'T YOU PAY 50¢—maybe even a buck—for an idea that would help you build a better plant? Here's your chance. The 21 reprints listed below are a storehouse of ideas on planning, equipping, and maintaining plant buildings. Take your pick. Most are 50¢—the exceptions are marked. If you get one good idea from each—and we think you will—we think you'll have gotten your money's worth. If you agree, just circle the ones you want on the handy coupon below.

PLANT BUILDING REPRINTS

Editor, FACTORY, 330 W. 42nd St., N. Y. 36, N. Y.

Please send me copies of the reprints represented by the numbers circled, at 50c per copy (except where different price is marked). I enclose check ( ) money order ( ) for $.....

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148 149 150 151 153 155 156

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PLANT LAYOUT

15. Plant Layout
125. Adopt the Best in Plant Layout

PLANT SERVICES

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131. Making Fullest Use of Mechanical Service Equipment
142. Planned Lighting
148. Industrial Noise
156. Air Pollution—A Big Problem Today
149. Select the Right Floors
150. Install Floors for Long Life
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153. Electricity is Everybody's Business

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147. Materials Handling in Today's and Tomorrow's Plants
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The Factory of the Future ($1.00)
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GM's Fire
What the Norton Company learned from the Tornado Disaster (35¢)
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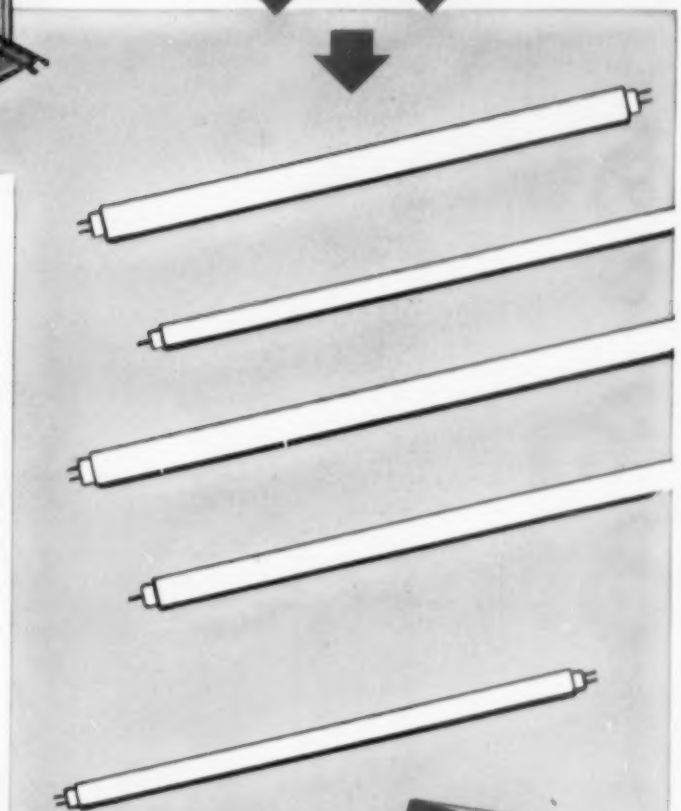
CERTIFIED CBM BALLASTS

...give you more economical Fluorescent Lighting

because they are "Tailored to the Tube"



Every type and size of fluorescent tube has its own specific electrical requirements. Thus, to get ideal performance and lighting economy, it is essential that the ballasts provide precisely the electrical needs of the tubes they operate.

CERTIFIED CBM BALLASTS are "Tailored to the Tube." Built to exacting specifications, then tested and checked by ETL, an independent agency, CERTIFIED CBM BALLASTS are a dependable assurance of both satisfactory and economical fluorescent lighting.

Certified CBM Ballasts

PROVIDE:

LONG BALLAST LIFE
FULL LIGHT OUTPUT
LONG LAMP LIFE
TROUBLE-FREE OPERATION

all of which contribute to easier maintenance and fluorescent lighting economy.

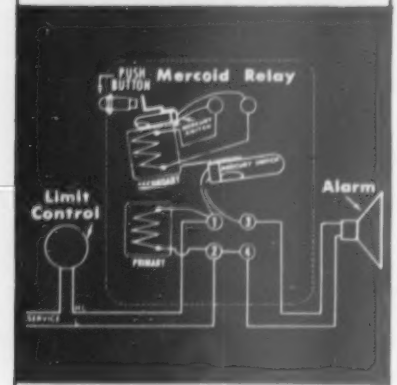
Eight of the country's leading manufacturers of ballasts make CERTIFIED CBM BALLASTS. Participation in CBM is open to any manufacturer who wishes to qualify.

Send for free booklet, "Why It Pays to Use CERTIFIED CBM BALLASTS in Fluorescent Lighting Fixtures."

CERTIFIED BALLAST MANUFACTURERS
2116 KEITH BLDG., CLEVELAND 15, OHIO

MERCOID®
MERCURY SWITCH EQUIPPED
RELAY

for Audible or Visual Alarm



The control which senses the alarm circuit is connected in series with the primary coil of the relay. The alarm control closes its circuit to supply current to the relay primary coil and through the normally closed mercury switch of the relay to the Audible or Visual Alarm. Pushing the manual button of the relay (or through a momentary contact by a remote switch connected to the pilot circuit) causes the secondary coil to move upward, opening the normally closed mercury switch and stopping the Alarm. A lock circuit in the relay holds the alarm circuit open as long as current is supplied to the primary coil of the relay. When the alarm control opens its circuit interrupting the current to the relay primary coil, the magnetic repulsion holding the relay secondary coil up is interrupted and the secondary coil drops from its own weight. The alarm circuit sequence is thus reestablished automatically and is ready for another operation at the demand of the alarm control.

Available for 115, 230 or 440V. A.C. current or similar D.C. voltages.

Our engineers are at your service—send in your control problem or

WRITE FOR BULLETIN CA-8R

THE MERCOID CORPORATION
4211 Belmont Ave., Chicago 41, Ill.

FACTORY / CATALOG NEWS

Begins on page C-32

To get these catalogs, circle item numbers on the Reader Service card next to back cover.

71—Telephone System. Report No. 104 tells how a brewery keeps step-by-step control of operations with a "P-A-X" business telephone system. Photos and diagrams demonstrate control over administration, processing, handling. 8 pages. *Automatic Electric Sales Corp.*

72—Surface Metal Raceways and Fittings. Eight engineering data sheets describe case applications in factory lighting modernizatiion, multi-pancake layouts, telephone and convenience outlet wiring, installation for room air conditioners. Illustrated. *Wiremold Co.*

73—Transformers and Substations. Load center units, 100 to 3000 kva., for voltages to 15,000 are described in Bulletin 655. Tells how these dry-type units require no fireproof vaults or other enclosures. Application, construction data. 12 pages. *Sorgel Electric Co.*

74—Transformers. Dry-type models are illustrated for power and lighting circuits, electric furnace control, phase changing, indoor substations, machine control circuits, motor starters, specialty uses. Supplement on operation. Bulletin HD499. *Hevi Duty Electric Co.*

75—Bus Duct Systems. Engineering and dimensional data on systems with aluminum conductors. Information on duct sections, fittings, cable tap boxes, expansion joints, wall and roof flanges, and adapters. Bulletin AB-760. 50 pages. *Bulldog Electric Products Co.*

76—Underfloor Distribution Systems. Catalog 35-4UR describes and illustrates parts that make up two systems — "Preset Locked-in" system for new buildings, "Flushduct" system for existing buildings. Tells how to design an underfloor system. 52 pages. *Walker Brothers.*

77—Transformers. Air-cooled, dry-type units are featured in Bulletin 155—¼-2500 kva., single phase; 1-3000 kva. 3-phase, 2-phase, and

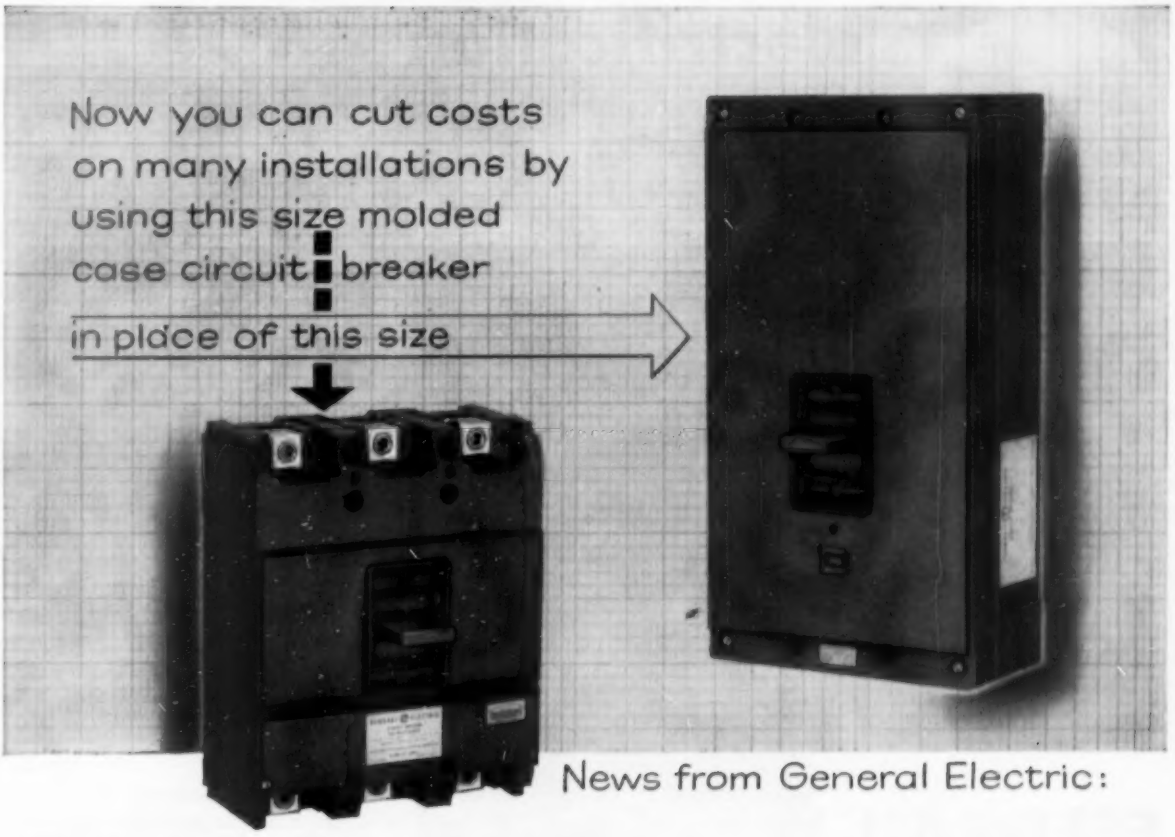
WHY
you can count on National for fast electrical repair service

- a large staff of engineering specialists
- wide experience with all types and makes of large rotating electrical equipment, including that of foreign manufacture
- a wire mill and a large stock of raw copper for on-the-spot production of wire as it is needed
- a complete department for fabrication of insulating materials
- unequaled shop facilities
- a large staff of skilled craftsmen for coil production and installation
- highly competent winding supervisors for on-the-job supervision of coil installation—anywhere in the world
- a willingness to work around the clock, if necessary, until our out-of-service equipment is back at work

Don't wait until an emergency arises to get acquainted with National's facilities and services. If you operate rotating electrical equipment of any kind, it will pay you to write for details—today.

TRADE MARK

NATIONAL ELECTRIC COIL CO.
COLUMBUS 16, OHIO, U. S. A.



News from General Electric:

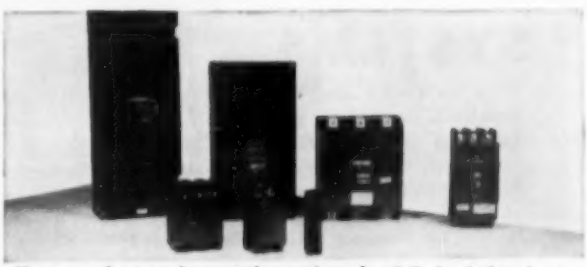
NEW 480-volt I.C. ratings on circuit breakers give you low-cost circuit protection

Formerly contractors and industrial users had to use 600-volt interrupting ratings for circuit breaker applications at both 480 and 600 volts. Now, General Electric offers you new 480-volt Interrupting Capacity ratings for the complete line of G-E industrial circuit breakers (and a 25% increase for the L frame breaker at 240 volts)—and every rating has been tested and proved in the world's largest electrical short circuit laboratory.

In many installations, these new I.C. ratings will allow you to use a smaller General Electric breaker in place of a larger breaker (or even in place of heavier, more costly equipment). You get the same protection for your expensive electrical equipment as before—but at less cost—with G-E molded case circuit breakers.

You get on-the-spot delivery in most cases, too. A new General Electric plan provides for separate stocking of enclosures and breakers by your G-E Distributor. That means you get faster delivery of any of G.E.'s wide choice of circuit breakers in your selection of NEMA 1 and 1A enclosures.

See your G-E Distributor today for full details on the new interrupting ratings and the fast delivery plan! Trumbull Components Dept., General Electric Company, Plainville, Conn.



Here are the new interrupting ratings for G-E circuit breakers:

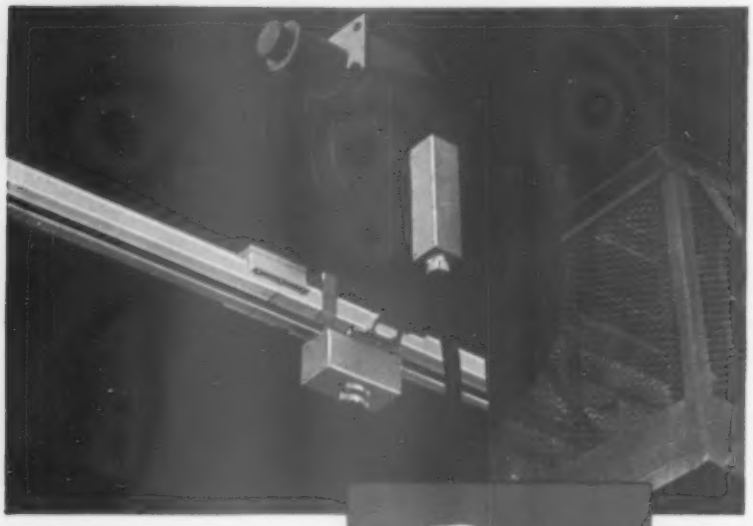
Frame size	New 480-volt ratings (asymmetrical amperes)	600-volt ratings (asymmetrical amperes)
F frame	15,000	15,000
J frame	20,000	15,000
K frame	25,000	25,000
L frame	35,000	25,000

L frame at 240 volts now has a 50,000-ampere interrupting rating—old rating was 40,000 amperes.

GENERAL ELECTRIC

safe

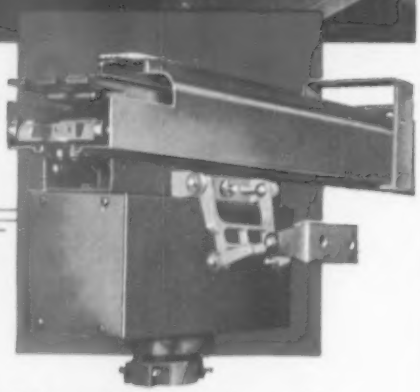
electrification for HEAVY DUTY CRANES and HOISTS



FEEDRAIL®

Moving

POWER SYSTEMS



Why let Crane and Hoist wiring endanger workers or be a potential hazard to your plant? Heavy Duty Feedrail trolley busways give you safe electrification because:

1. **They're a built-for-the-purpose system, designed and constructed expressly for high amperages.**
2. **All current carrying conductors and trolley contacts are protected every inch of the way.**

In addition to maximum safety, Heavy Duty Feedrail fits your requirements. Its standardized components—accurately, ruggedly constructed—make for fast, easy installation. Its low maintenance, long life and continuous dependable service are economy factors in plant operation.

SOLD BY LEADING ELECTRICAL DISTRIBUTORS

REPRESENTATIVES IN PRINCIPAL CITIES

Never Becomes Obsolete

FEEDRAIL CORPORATION
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FACTORY / CATALOG NEWS
Begins on page C-32

To get these catalogs, circle item numbers on the Reader Service card next to back cover.

phase changing. Portable, wall- and floor-mounted models are among those illustrated. 8 pages. *Sorgel Electric Co.*

78—Switchgear. Metal-clad switchgear for indoor and outdoor use (7.5 and 15 kv.) is the subject of Bulletin 7004C. Points out construction, operating, safety features. Drawings of arrangements and layouts. Includes accessories. 26 pages. *I-T-E Circuit Breaker Co.*

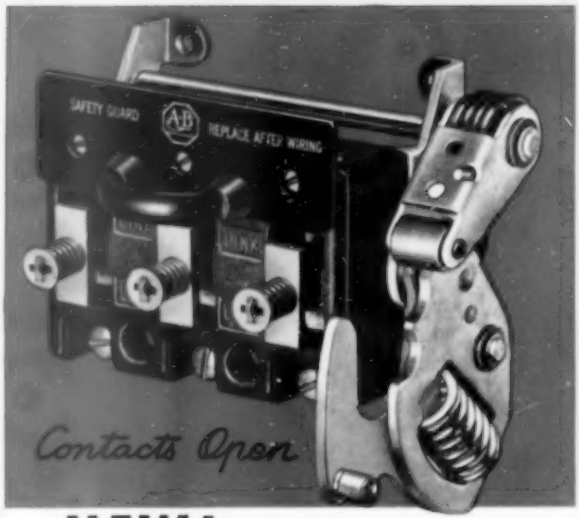
79—Trolley Duct. Here's the story on "Trol-E-Duct," a flexible system for mobile industrial lighting and light-duty power supply. Tells how to assemble, disassemble, and install. Includes photos and diagrams. 18 pages. Bulletin UT-650. *Bulldog Electric Products Co.*

80—Signal Equipment. This 130-pager is divided into tabbed sections on bells; buzzers; chimes; contact devices; transformers; door openers and relays; annunciators; horns, sirens, and air trumpets; synchronous clocks; accessories. Handy index. *Sperti Faraday Inc.*

81—Close Differential Relays. Publication No. 592 features a compact, low-cost unit for use in power and lighting systems to protect electrical equipment against low voltage or over-voltage conditions. Chart shows voltage frequency characteristics. *Automatic Switch Co.*

82—Circuit Breakers. Molded case breakers, enclosed large air breakers, and distribution cutouts are described and illustrated in the "Speedfax" catalog. Selection charts and application data. Helpful mounting and wiring diagrams. 60 pages. *I-T-E Circuit Breaker Co.*

83—Magnetic Relay. This 8-pager illustrates sectional pole construction of the Type "PM" relay. Table shows numbers of circuits and combinations of normally open and closed contacts available in standard models. Shows ease of maintenance. *Clark Controller Co.*

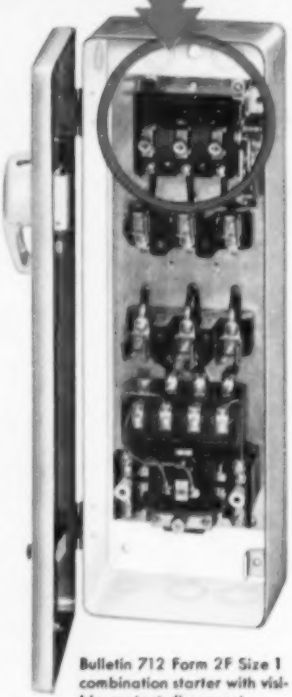


NEW! The first disconnect switch with movable contacts that are plainly visible in the OFF position

Allen-Bradley has finally succeeded in producing a disconnect switch, which removes all doubt whether the movable contacts are in the "open" or "closed" position. When in the "open" position, they are plainly visible—as open; when in the "closed" position, they are dropped—out of sight in the arc hood.

The moving, double break contacts of the new disconnect (shown in yellow above) move horizontally in individual arc chambers. When the disconnect is CLOSED, the moving contacts are DOWN in the arc chambers. In the OPEN position the moving contacts are UP in plain view, as shown in the colored illustration directly above.

If a contact should stick or weld, it will fail to rise to its "open" position and thereby indicate that the respective "link" remains closed—a plainly visible warning signal to the maintenance man.



Bulletin 712 Form 2F Size 1 combination starter with visible contact disconnect.

A unique feature of the new line are the interlocks built into the disconnect lever.

First—the disconnect lever is interlocked with the door latch so that the door cannot be opened unless the lever is in the OFF position. This assures that the starter is "dead" when the cabinet is open and is safe to inspect.

Second—the disconnect lever has a concealed release pin used only by authorized persons for opening the cabinet door, if needed, without shutting down the motor.

Standard operating lever permits use of one to three padlocks to lock in "off" position, but also can very simply be changed to permit padlocking in "on" position.

These new Bulletin 712 combination starters are available in NEMA Type 1, 4, 7, 9, and 12 enclosures. They are listed from 1 to 100 hp, 220 v; 200 hp, 440-550 v.

Allen-Bradley Co., 1316 S. Second St., Milwaukee 4, Wis. • In Canada—Allen-Bradley Canada Ltd., Galt, Ont.

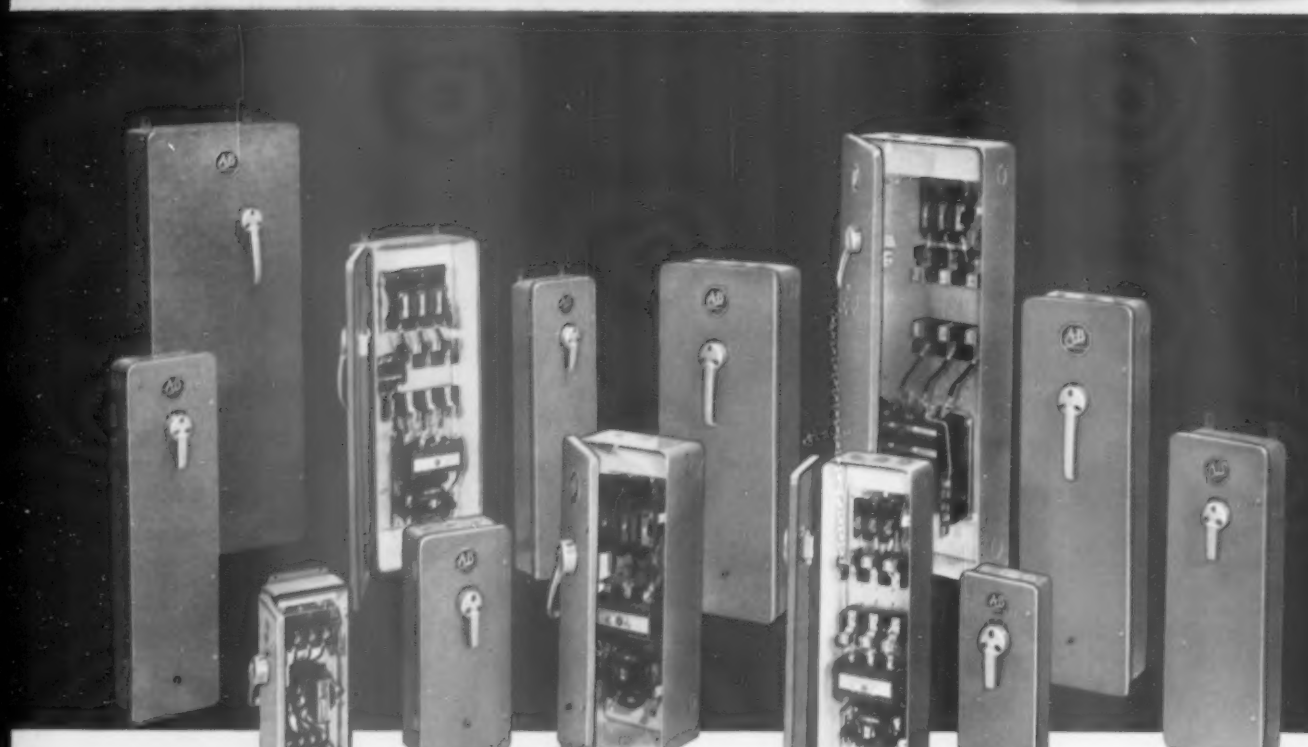
A-B

ALLEN-BRADLEY

TROUBLE FREE MOTOR CONTROLS

QUALITY

4-56-MR

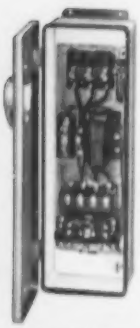


A New Line

OF BULLETIN 712 COMBINATION STARTERS

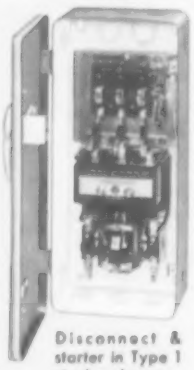
Allen-Bradley announces a modernization of its Bulletin 712 combination starters that should meet with the instant approval of plant "safety" organizations. The cover cannot be opened unless the operating lever is in the "off" position; also the movable disconnect contacts are **plainly visible** when this switch is "open." A welded or sticking contact can be detected instantly. The new operating lever contains a concealed latch pin which permits the maintenance man to open the cabinet without opening the disconnect and stopping the motor. Disconnect switch can be padlocked with three locks—in the open position. It can be arranged for padlocking in running position.

SIZE 1



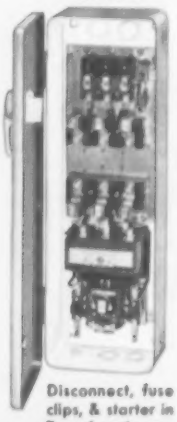
Disconnect, transformer, & starter in Type 12 cabinet.

SIZE 2



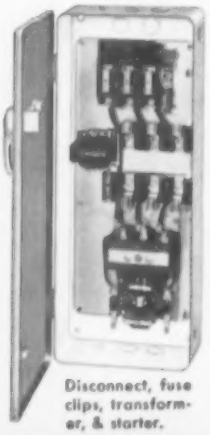
Disconnect & starter in Type 1 steel enclosure.

SIZE 2



Disconnect, fuse clips, & starter in Type 1 enclosure.

SIZE 3



Disconnect, fuse clips, transformer, & starter.

SIZE 4

Disconnect, fuse clips, & starter in Type 1 enclosure.

Allen-Bradley Co.
1316 S. Second St.
Milwaukee 4, Wis.

In Canada—
Allen-Bradley Canada Ltd.
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ALLEN-BRADLEY

QUALITY

TROUBLE FREE MOTOR CONTROLS

A-B Quality

4-56-MR

Help yourself to clear profits from fresh air. Graybar will be glad to work with you or your electrical contractor in planning a ventilating system using standard ILG units that will cut worker fatigue, reduce costly accidents and material spoilage and speed production all around. Call Graybar first.

VENTILATION

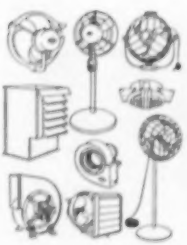
. . . your key to lower costs

Fumes, dust, heat and foul air lower working efficiency and increase your plant operating costs.

Whether the situation calls for portable fans for spot cooling or self-cooled propeller fans and universal blowers for large-volume circulation, ILG fans and blowers, available from Graybar nationally, are the best-built units you can provide. Call your nearest Graybar office for a free survey or help on any ventilation problem. We'll be glad to help you in the selection of the ILG equipment best suited for individual requirements and to furnish accurate information to assist you or your electrical contractor in working out practical job time tables.

Remember, Graybar is your most dependable *single* source of everything electrical—over 100,000 electrical items for wiring, lighting, communication, power as well as ventilation.

639-114



This catalog presents the wide range of ILG units available from Graybar. If you are located in the U. S. or possessions write us for a copy.

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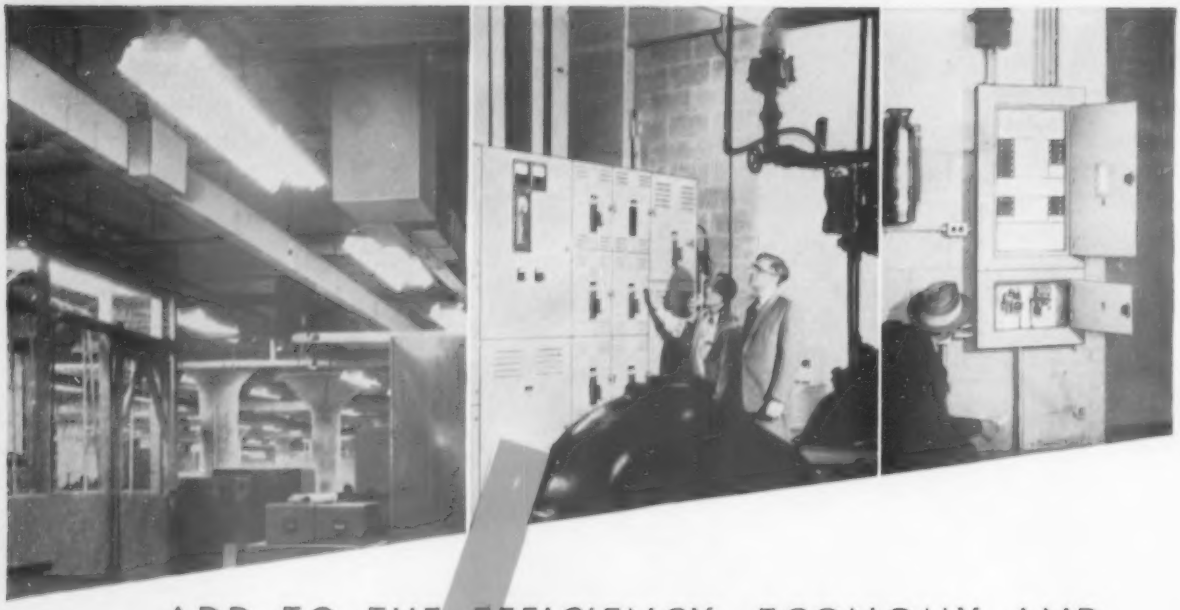
GRAYBAR ELECTRIC COMPANY, INC., 420 LEXINGTON AVENUE, NEW YORK 17, NEW YORK, IN OVER 130 PRINCIPAL CITIES



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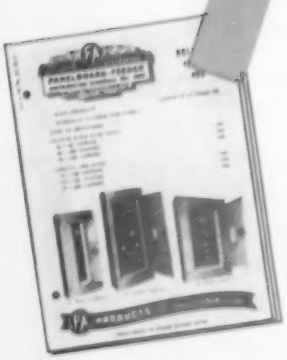
WITH FA

ELECTRICAL PRODUCTS

For the finest in power and light control and distribution, specify products bearing the trade-mark FA in all your plans for new or modernized industrial buildings.

A pioneer in the electrical industry, FA, over the years, has built an enviable reputation for the manufacture of products of the highest quality — products that have been carefully designed and engineered to provide the maximum in safety, dependability and flexibility — products that will give longer-lasting and trouble free service, which means greater plant operating efficiency and economy.

If you want your client to have power and light control and distribution, geared to the modern tempo, then include FA products in all your future industrial planning.



For complete information on all FA products, contact your nearest FA representative listed in Sweets or send for bulletin.

makers of:
busduct • panelboards • switchboards
service equipment • safety switches
load centers • Quikheter

Frank Adam Electric Co.

Phone JEfferson 3-6550
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TYPICAL FA PRODUCTS

FOR USE IN INDUSTRIAL PLANTS

The products shown on this page are illustrative of the wide range of products manufactured by Frank Adam Electric Company for the control and distribution of power and light for industrial buildings.

All products are approved by the Underwriter's Laboratories, Inc., for label service.

For the finest in power and light control and distribution for industrial and all other buildings, specify products bearing the trade-mark (FA).

Powerplugin

Midget Size Powerplugin

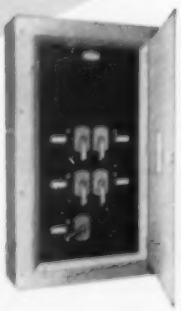
High Efficiency Busduct

SCSD Switch

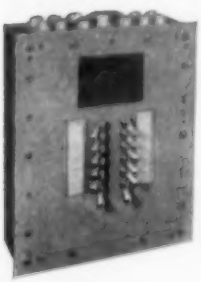
QP Quicklag P Panelboard

Column type Panelboard

Shutlbrak Switch Board



Shutlbrak Panelboard



Duttite Panelboard

Developments in Production Testing Instruments

TESTING ENAMEL THICKNESS with the permanent magnet gage at this stove plant helps assure quality production.

Here's News About Other G-E Instruments to Help You Maintain Quality in Production Testing and Inspection

SURFACE ROUGHNESS SCALES provide time and cost saving standards for machined surfaces. Three types are available: Standards for designers, flat and cylindrical for use on the production line. Save money by specifying degree of machining necessary. Avoid overfinishing.

THE DRAFTSMAN SELECTS the proper symbol on his surface roughness specimen. He then indicates on his drawing the exact finish required. Specimens can be used to standardize production and set tolerances on every finishing operation in your plant. A complete set of roughness specimens is priced at **$91.56***.

MACHINIST CHECKS finish with the surface roughness scale to be sure that it meets the requirements. Scales can also be used by inspectors to catch defective work or to check shipments which are being received from vendors. Cylindrical Scales **$34.44***; Flat Scales **$21.67***.

GENERAL ELECTRIC ANNOUNCES . . .

NEW Self-contained Thickness Gage; Assures Faster Product Inspection

General Electric's new permanent magnet thickness gage speeds production testing and helps assure you savings in materials. It is portable, self-contained and small enough to hold in your hand.

The new gage gives non-destructive thickness measurements of non-magnetic coatings, such as paint or plating, on magnetic iron or steel. Other non-magnetic materials—plastic, celluloid, mica, and paper—can also be measured when placed on a smooth, magnetic plate.

DUAL-RANGE SCALES of 0 to 7 mils and 1 to 60 mils are expanded at the lower end to give you greater readability.

"GO—NOT-GO" POINTERS simplify testing for production quality control.

HIGHLY ACCURATE, the new gage gives readings of ±5% to ±10% within ±50% of the calibration point.

SELF-CONTAINED, the PM Gage requires no external power. An Alnico magnet furnishes the necessary flux.

EASY TO USE, the new PM thickness gage does not require experienced or technically trained personnel.

FOR FURTHER INFORMATION contact your nearest G-E Apparatus Sales Office or Distributor, or send coupon for bulletin GEA-6458.

EASY-TO-READ DIAL of the new PM thickness gage assures faster, more accurate operation. Adjustable "go—not-go" pointers can be adjusted plus or minus from the desired thickness for limit testing.

ZAHN VISCOSIMETER checks viscosity quickly and easily—in 20 to 40 seconds. Temperature and time of flow is measured in one simple operation. You can maintain high quality by checking viscosity of paints this accurate and convenient way. Price **$13.86***.

NEW

1956 CATALOG of G-E Measuring Equipment

New 40-page catalog describes many of General Electric's production testing and measuring devices. For your free copy, check the coupon.

MAIL COUPON NOW TO:

GENERAL ELECTRIC COMPANY, Section A585-44
Schenectady 5, New York

Please send me the following bulletins:

- ☐ PM Thickness Gage (GEA-6458)
- ☐ Surface Roughness Scales (GEC-774)
- ☐ Zahn Viscosimeter (GEC-339)
- ☐ Measuring Equipment Catalog (GEC-1016)

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*Manufacturer's suggested retail price.

Progress Is Our Most Important Product

GENERAL ELECTRIC

DON'T MISS JULY FACTORY ★ DON'T MISS JULY FACTORY ★ DON'T MISS JULY FACTORY

Want More for Your Electrical Dollars?

Then don't miss the special report coming in the July issue of FACTORY

FACTORY editors have made a depth study of electrical practices in the entire industrial community of Toledo, Ohio. Covered 55 plants in a comprehensive look-see at both electrical distribution and electrical utilization. By the same technique of personal interviews with plant men that made last July's special report on "How to Get More for Your Handling Dollar" so successful.

This upcoming artic'e will give you:

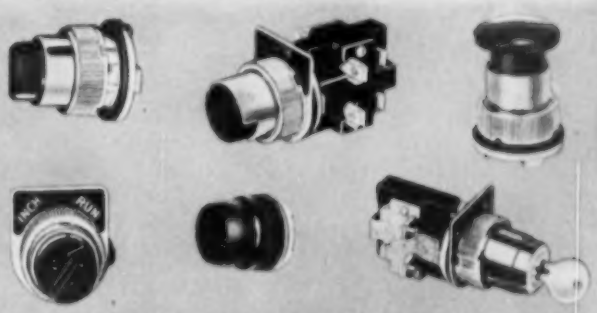
1) A full-fledged program to guide you in organizing and operating your plant's electrical facilities and equipment. Based on findings from some of the most important plants in the country, big and little.
2) 20 case histories, some of major article importance, describing new ideas and equipment applications.

Tie a string around your finger now . . . make a mental note . . . write it down on your calendar . . . or make a note to tie a string around your calendar.

But don't miss the July issue of FACTORY!

DON'T MISS JULY FACTORY ★ DON'T MISS JULY FACTORY ★ DON'T MISS JULY FACTORY ★ DON'T MISS JULY FACTORY ★ DON'T MISS JULY FACTORY ★ DON'T MISS JULY FACTORY

Oil-Tite* Control Station
. . . 1 to 16 units



Standard Components Available

Standard Duty
Available in one, two and three unit stations.

Heavy Duty
Comes in a choice of from one to seven unit stations.

Pendent Type
In standard, heavy duty and Oil-Tite enclosures.

Special Service
Units for mining, steel mills, extra heavy duty.

Get delivery now on complete Westinghouse pushbutton line

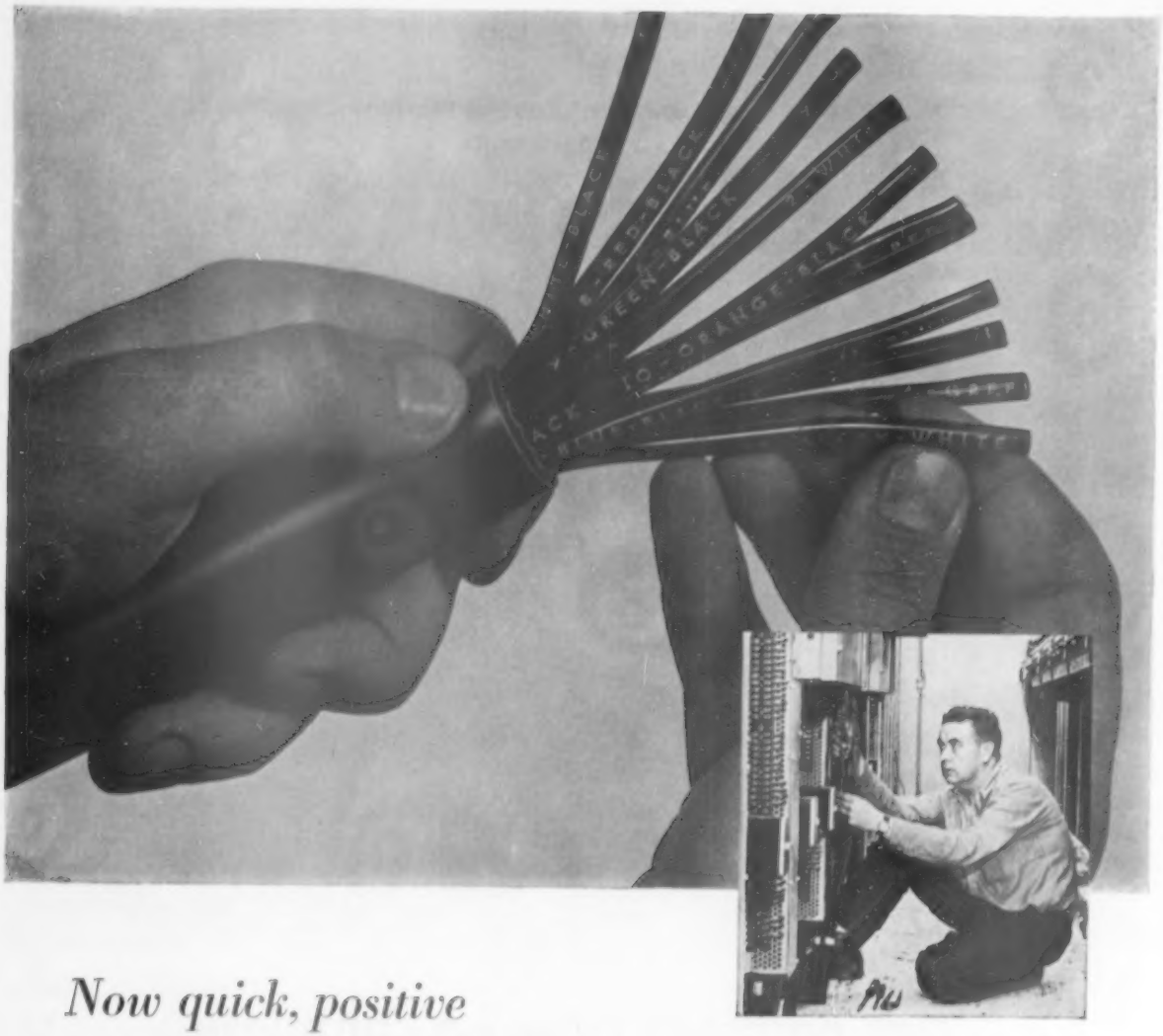
The most complete selection of pushbutton units in the industry—for standard or heavy duty, oiltight, pendent-type, and corrosion-resistant applications—now available for immediate shipment.

Standardized and interchangeable component parts quickly give you the right pushbutton for every application. Even the latest additions to the Westinghouse pushbutton line such as the new and unique Push-to-Test indicating light, which permits an immediate check for burned-out bulbs, are always available right "off the shelf". Immediate delivery also available on a choice of enclosures for surface, flush or pendent mounting—for indoor, outdoor, water and dust-tight, oil-immersed or corrosion-resistant applications.

Order Westinghouse pushbuttons *today*—get 'em *tomorrow* (or sooner), right off the shelf. Call the control sales engineer at your nearest Westinghouse office, or write Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pa., and ask for descriptive bulletin 15-000. J-50191-A

*Trade Mark

YOU CAN BE SURE...IF IT'S
Westinghouse



Now quick, positive control circuit identification

Get these 5 specific advantages when you use Rome Control Cables with surface printed color-coding . . .

1. Easy, sure identification of control circuits, even when light is poor or handling has dirtied coverings.
2. The superior aging and physical properties inherent in all-black sheaths and insulations.
3. Color-code printing on *both sides of every conductor at intervals of 1½ inches or less.*
4. Permanently clear white lettering over black conductors, for maximum legibility.
5. Six primary printed color designations with additional tracer combinations for cables of more than six conductors.

Rome Control Cables are offered in three basic types:

RoZone® insulated—RoPrene sheathed—Type CRO-1 • The ultimate in control cable design and performance. Conductors are insulated with RoZone, a high-quality oil-base compound, and individually sheathed with RoPrene (Neoprene). RoPrene sheath provides over-all protection.

RoMarine insulated—RoPrene sheathed—Type CRM-1 • A moderately priced, high-quality, general-purpose design. Individual conductors are insulated with heat- and moisture-resistant compound, with an over-all sheath of RoPrene (Neoprene).

Rome Synthinol® insulated—Rome Synthinol or RoLene sheathed—Type CT-1 • A quality thermoplastic construction with RoLene (polyethylene) insulation protected by a Rome Synthinol (polyvinyl chloride) or RoLene sheath. A small diameter, moderate cost control cable.

Application engineering, detailed specifications or more complete information on printed color-coding are yours for the asking. Write today.

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SECTION D

Plant Services

GENERAL AWARD WINNERS

General Electric Company
General Purpose Control Department
"Designed for Changes Sure to Come" . . . . D- 2

Parker-Kalon Division
General American Transportation Corporation
"Built for Tomorrow's Needs" . . . . . D- 6

Sylvania Electric Products Inc.
Lighting Division
"Pace Setter for Plant Services" D-10

Briggs & Stratton Corp.
"Ready With the Best in Services" D-14

SPECIAL AWARD WINNERS

Shell Oil Company D-18

General Electric Company
Specialty Control Department D-19

Western Electric Company, Inc., *Radio Division* . D-19

The Daven Company D-20

Mead Johnson & Company D-20

General Electric Company
Industry Control Department D-21

Silicones Division, Union Carbide and
Carbon Corporation . . . . . D-21 & D-22

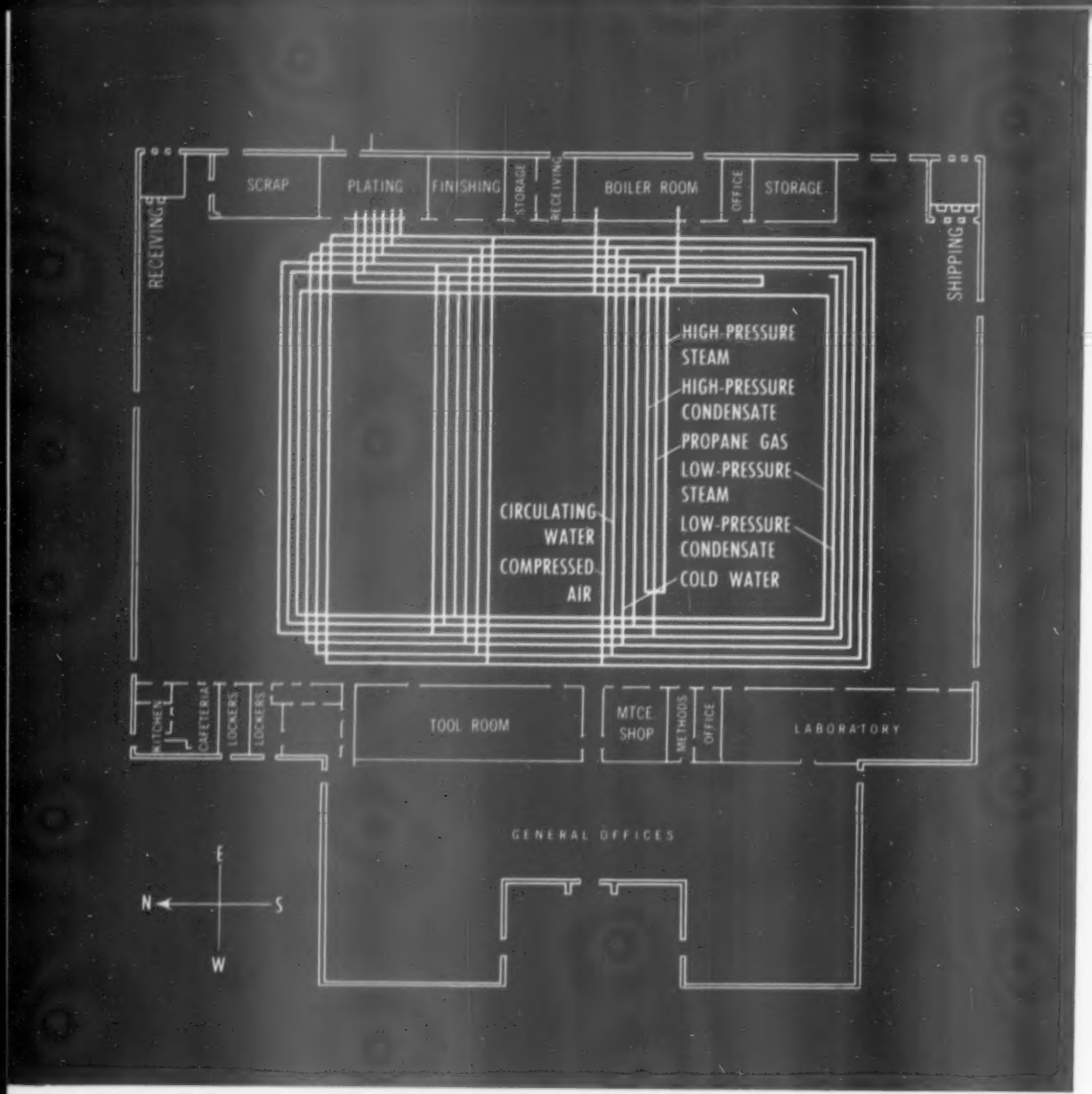
The Trane Company D-21

Schick Incorporated D-22

Catalog News D-31

Equipment Review D-80

D



Services everywhere No section of the manufacturing area is far from any needed service, thanks to this extensive loop coverage. From these main lines, branch lines are tapped off into every bay where the service is needed.

Designed for Sure-to-Come Change

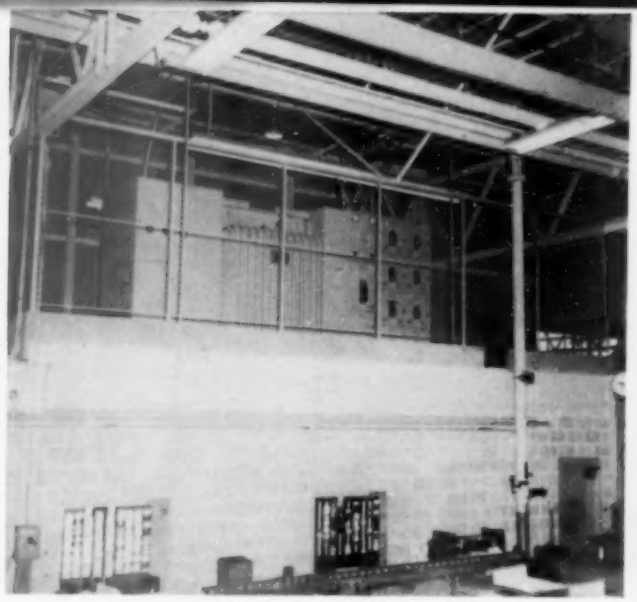
ONE SURE THING about the controls business: Things are going to be different soon. Standard controls are constantly being improved and redesigned. New controls are coming off the drawing boards at a rate matched by few other products. And, as the controls change, so must the plants that build them.

The diagram above shows some of the many ways that the planners of G-E's new General Purpose Control Department plant have planned for that "sure-to-come" change. They've built in a degree of flexibility—in the building itself and in the plant services—that should guarantee super-easy layout changes at any time. Here are examples:

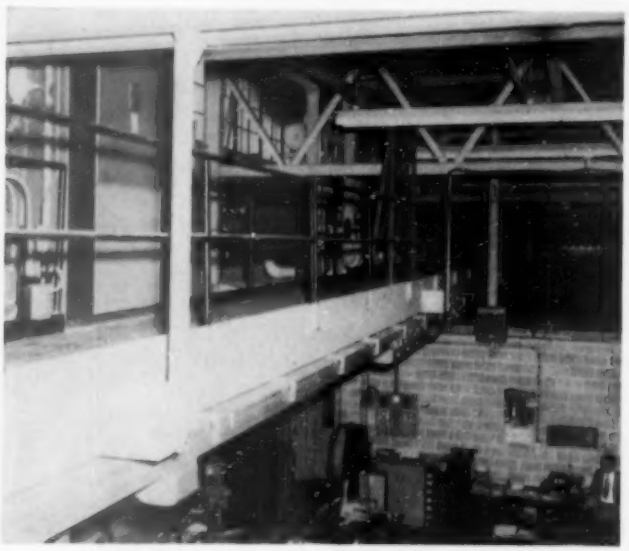
. . . *Building is designed* to minimize interference with future rearrangement. All permanent facilities such as the boiler house, plating room, toolroom, cafeteria, locker and toilet rooms, and the like were located in the two outside bays (front and back, or

GENERAL PURPOSE CONTROL DEPARTMENT
GENERAL ELECTRIC COMPANY
BLOOMINGTON, ILL.

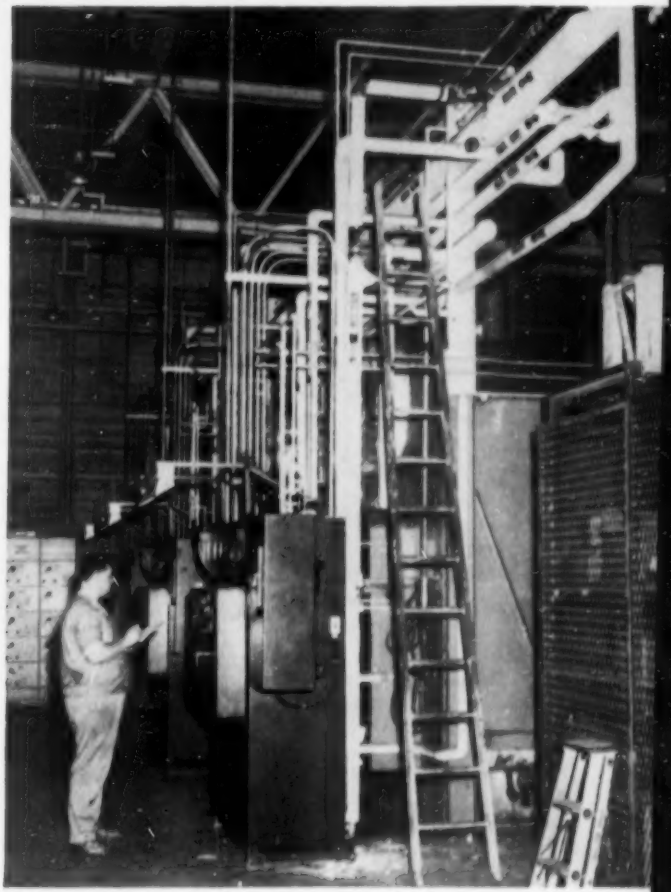
FOR CITATION AND EXTERIOR VIEW
OF PLANT, SEE PAGES A-8 AND A-9



OUT OF THE WAY of production, all substations are located on mezzanines. They are close to center of loads—minimizing cable runs—and are convenient to maintain.



CATWALKS hold other service equipment. This one supports the air conditioning units and heat exchangers. Plug-in bus run is visible here just below catwalk.



EXPANDABILITY is built into most services. Three boilers—plenty for present needs—have been installed. There's space for another in the wire-enclosed area.

east and west bays). This leaves the entire center area of the plant—345x660 feet—completely clear of obstructions except the columns. And bay size is 30x60 feet—plenty big enough for layout flexibility. Truss height was established at 18 feet, 10 inches to provide plenty of headroom for existing and future conveyors and storage. Fluorescent lighting is out of the way—16 inches above lowest chord of truss.

All machines rest on vibration-damping pads, and are not attached permanently to the floor. And only 15 of the 800 machines in the plant require special foundations—hardly a bar to flexibility.

. . . *Utility lines blanket* the entire manufacturing area. The diagram on facing page shows the three major loops supplying high- and low-pressure steam, domestic water, circulating water, compressed air, and propane. Note that the loops shown are only the basic coverage. Each of these lines is supplied with tap-off valves at intervals—depending upon the service—of between 20 feet and 60 feet.

Branch lines are tapped off as needed, run perpendicular to the main loop into all bays where that service is required. A little arithmetic indicates that the maximum distance between any point of use and a branch line is 30 feet—assuring real flexibility.

. . . *Bus duct runs* from front to back of the plant on 60-ft. centers—is mounted along every other bay line. Thus the maximum distance between bus duct and load is 30 feet.

Turn the page

Begins on page D-2

"Flexibility that guarantees easy layout changes..."

Expandability, too—The south wall of the plant and one-half of the east wall were made up of concrete block and steel sash—which will be relatively easy to remove and re-use in the event building expansion becomes necessary. All the existing service equipment and utility lines have between 15% and 20% greater capacity than is presently needed. And space has been provided in the boiler room for the addition of an extra boiler and air compressor.

UTILITY DETAILS

Water—Boiler water is softened and treated to remove carbonates and sulphates.

A 200,000-gal. water tank, at ground level some 200 feet behind the plant, provides the fire-protection water for the sprinkler system and the hydrants that surround the plant. Water is pumped from the tank by a 1000-gpm. pump powered by a 75-hp. motor.

Process water that can be recirculated and water used in the air-conditioning system is cooled in a roof-mounted cooling tower. To insure equal flow through the tower in spite of variations in usage, G-E provided 500-cu.-ft reservoirs both ahead of and immediately after the cooling tower.

Propane—A 1000-gal. propane storage tank supplies the gas used in annealing and brazing operations, and in the ignition system of the boiler burners.

Steam—Three oil-burning boilers each generate about 15,000 pounds of steam per hour—and there's room for another unit of the same size in the boiler room. Oil for these boilers is stored in two 25,000-gal. underground tanks, with shut-off valves that can be used in case of fire.

Steam is generated at 195 psi. It is distributed at this pressure by a run of pipe along the rear wall, and down one of the runs from back to front. At this pressure it is used for process purposes—cleaning, baking, and drying. It is reduced to 30 psi. for use in unit heaters, and at this pressure is distributed throughout the utility loop.

Disposal facilities—Sanitary waste goes directly into the Bloomington sewers.

Process wastes are neutralized and diluted continuously in a waste treatment room. The pH of the wastes are automatically controlled.

All combustible waste is burned in a separate incinerator building. Exhaust from process furnaces and sanding operations is run through a dust collector before it is exhausted to the outside.

Air handling—In the manufacturing area, ceiling-hung heaters mix outside air with recirculated hot air, change the air between four and six times an hour. Exhaust fans remove old air. In the summer, unit ventilators bring in cool outside air.

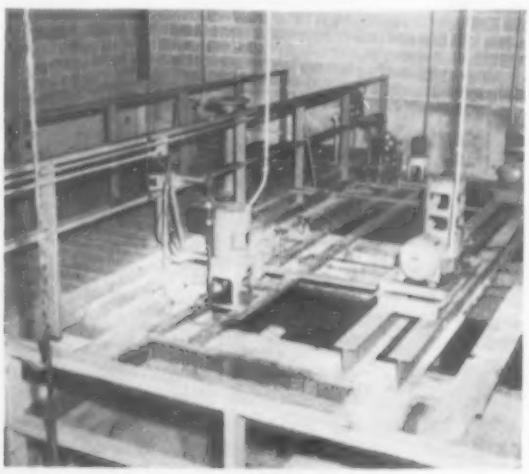
Plant protection—The plant is completely fenced, with a gatehouse. Tool and die area and tool crib are enclosed.

The manufacturing area is completely sprinkler-protected. The office area, because of the use of metal partitions and furniture, is considered fireproof and has no sprinklers. But a fire-alarm system has been installed.

Paint machines are protected by a low-pressure CO_2 system. As mentioned earlier, the plant is surrounded by an underground water loop with hydrants on close centers.

Electrical distribution—The electrical system is an interesting one. G-E uses a "modified-network" system that offers an excellent degree of reliability at

THREE-BERTH DOCKS are equipped with double doors and levelators. And here's a good look at the maintenance-free concrete-block and aluminum-panel walls.



WASTE-TREATMENT ROOM handles process wastes in 100-gal. lots. Control of pH of wastes is automatic. Acids are neutralized by passing through a lime basin.

AUDITORIUM SEATS 75, is generally used for training purposes, but is available for special meetings of any kind. It's typical of several "more-than-everyday" employee facilities, which include special buses that run to the plant at shift times, an employee store, softball and other recreational facilities—to mention just a few.

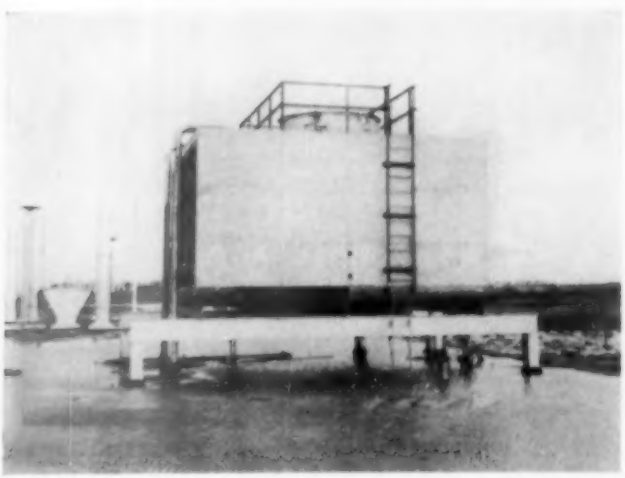
low cost. For details of the system—which wins one of FACTORY's Special Awards—see page C-21.

Miscellaneous facilities—Here are samples:

. . . *A plant-wide public address* system is operated by the telephone operator. This system is used for both paging and broadcasting music—for the first 15 minutes of each hour—to the plant.

. . . *Telephone and electrical lines* in the office area are laid beneath the asphalt tile floor, in fiber duct. Duct is run on 40-ft. centers in one direction, 5-ft. centers in the other, once again providing maximum flexibility.

. . . *Battery-powered lighting* is provided in the shop area. It switches on automatically in the event of power failure. And, since a power failure would cause damage in the annealing furnace, auxiliary power for it is supplied by a 5-kva. generator that is powered by a propane-burning engine.



COOLING TOWER handles any process water that can be recirculated, plus cooling water for air-conditioning system. Reservoir ahead of unit equalizes flow.

EMPLOYEE FACILITIES

The showers are located close to the "dirty jobs" in the plant. There are toilet facilities in each corner of the production area, so that one of the four is handy to any job location. Other facilities:

. . . *The cafeteria* has a seating capacity of 300. Groups of employees arrive for their half-hour lunch period at 10-min. intervals, minimizing jam-ups at the serving counters. Lunch is served between 10:50 a.m. and 1:10 p.m.

. . . *The dispensary* is fully equipped, even includes X-ray equipment. A nurse is on duty two shifts. And a doctor is at the plant 1½ hours per day, is on call any time.

. . . *A softball field* has been provided on the plant property. (Employees have a club that sponsors softball, basketball, golf, dances, bowling.)

. . . *A 75-seat auditorium* (pictured above) is used for training purposes.

. . . *A Bloomington bus company*—under an arrangement with the company—runs a special bus to the plant for the convenience of employees.

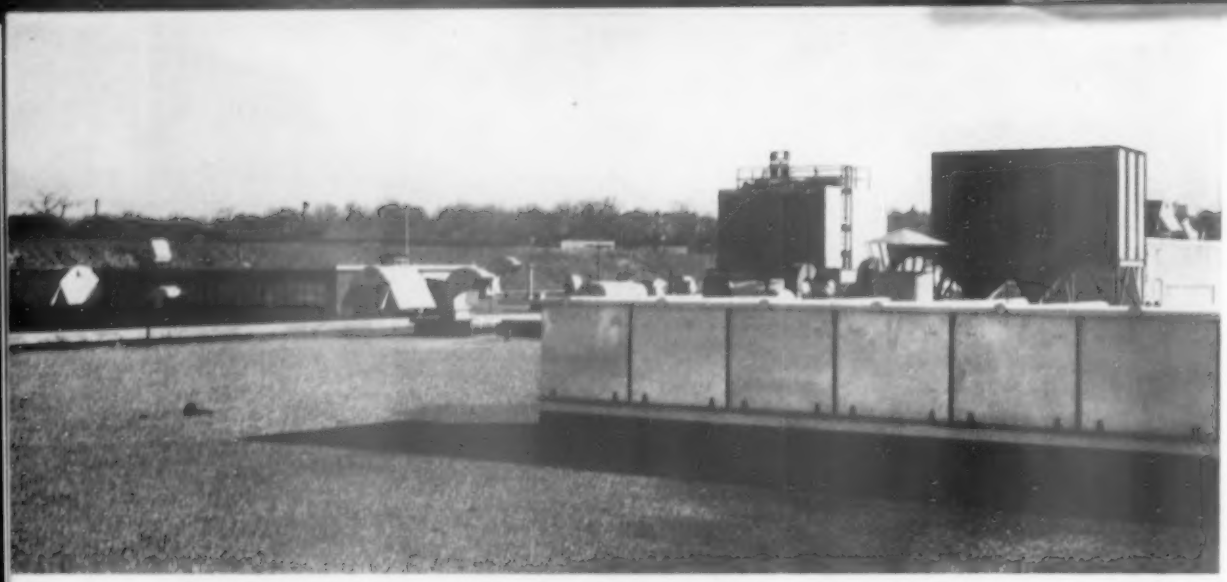
. . . *An employee store* adjacent to the guardhouse offers G-E products at a discount that makes disloyalty an expensive luxury.

. . . *Parking facilities* for 1200 cars are provided in a two-section lot—first-shift workers in one lot, second-shift workers in the other.

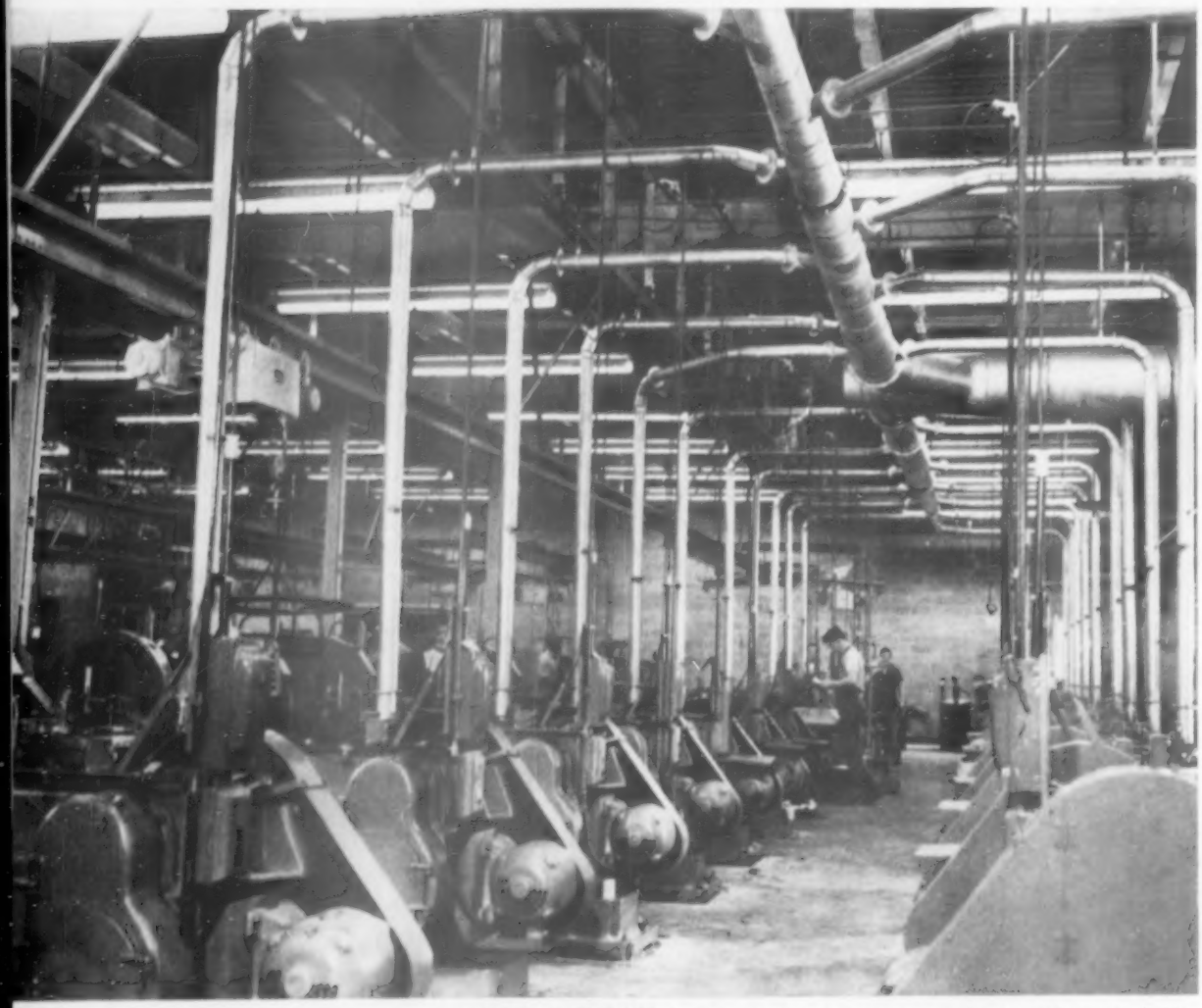
EASY MAINTENANCE BUILT IN

The exterior walls of the plant are of brick and concrete block, with steel sash and aluminum panel—all easy to maintain. The walls of all locker and toilet rooms, and the cafeteria, are tile; and the floors terrazzo or quarry tile—for "damp-rag" cleaning. The ceiling of the kitchen is easy-to-maintain aluminum acoustical type. Aisles are a minimum of 8 feet, with some main aisles 10 feet.

D



FOUR MAJOR SERVICES can be seen in this rooftop view. Right foreground: one of the plant's fire vents, opened by fusible link. Left: one of the two mezzanine locker rooms protruding through roof. Background: water-cooling tower, dust collector.



WITHIN A FEW FEET of any machine location, the services it needs are available. Duct system removes oil mist and fumes. Close glance will show run of bus duct above each machine line, minimizing length of flexible-cable drops.

Built for Tomorrow's Needs

IN YEARS TO COME, the plant operating men at Parker-Kalon's new Clifton (N.J.) plant won't have serious growing pains with their plant. Thanks to the planning that went on, literally for years, before the plant went into operation just 3 months ago. That same planning shows up everywhere, but nowhere is it more evident than where it doesn't show—under the floor and up in the trusses—where the all-important plant services are located.

No bars to flexibility—The services to the shop area are steam (at two temperatures), hot water (at two temperatures), cold water, gas, compressed air, and electricity. Runs of each of these services are laid out down the length of the shop, closely spaced.

Other "flexibility insurance:"

. . . *The floor* throughout the shop will support 1000 pounds per square foot. This is well in excess of the loading of any present or presently contemplated equipment.

. . . *Clear height* under trusses is 16 feet—much more than enough in a plant that is basically a small-parts operation.

. . . *Bay size* is only an "about average" 25 x 40 feet. But, again for Parker-Kalon's kind of operation and equipment, it's big enough for plenty of layout flexibility.

No bars to expandability—The plant's present floor area is 267,000 square feet. According to present plans, the maximum plant size for high operating efficiency would be 475,000 square feet. If production demands call for more area than that, P-K executives will think in terms of another plant. But there's plenty of room on the 14-acre site for the proposed "maximum plant."

In any case, the plant services were set up with plenty of expansion in mind. For example:

. . . *Either of the two boilers* now installed will carry the entire plant load—with just a little pushing. And there's room for a third boiler. Two boilers could carry the "maximum" plant, leaving one on standby.

. . . *Water is supplied* by the water company at 70 psi., by a 6-in. pipe; a 4-in. pipe would more than serve present needs.

. . . *The duplex cooling tower* can handle 1100 gallons per minute. Present needs: only 600.

. . . *The gas-service* pipeline is sized for three times present needs. And when, as is planned, the utility boosts the Btu. rating of the gas, the system will be, in effect, even more expandable.

. . . *Compressors* are installed sufficient to supply over twice present needs, meaning that one compressor is always on standby.

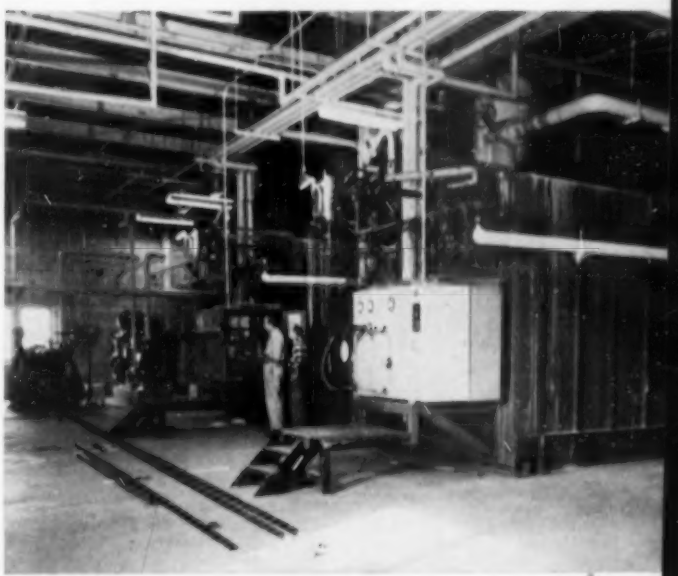
. . . *Estimated maximum power* demand in the existing plant is 2000 kva. But three 833-kva. type OA/FA transformers are already installed, for a capacity of 2500 kva. If fans are installed, their capacity will be boosted to 3400 kva. And provision has been made in the master substation for still another transformer. For the far future: Plans are already drawn for even greater expansion of the power system, if greater capacity is ever needed.

Other building and layout features guaranteeing plant expandability match the level of excellence set by the plant services:

. . . *All machines lines* were set up with vacant space left for additional machines. This insures quick and easy expansion of production on at least a limited basis.

. . . *All departments* that are not located against an outside wall (the toolroom, maintenance shop, plating, heat-treat, and control areas) are oversized. They've all been assigned 26% more space than is presently needed. And since none of them is the type that would expand as fast as production, this is calculated to be adequate to meet the proposed maximum expansion.

Turn the page



EXPANSION is no problem in boiler room. Either of these two boilers can carry entire present plant load. And (at right) there's room for another when it's needed.

PARKER-KALON DIVISION

GENERAL AMERICAN TRANSPORTATION CORPORATION

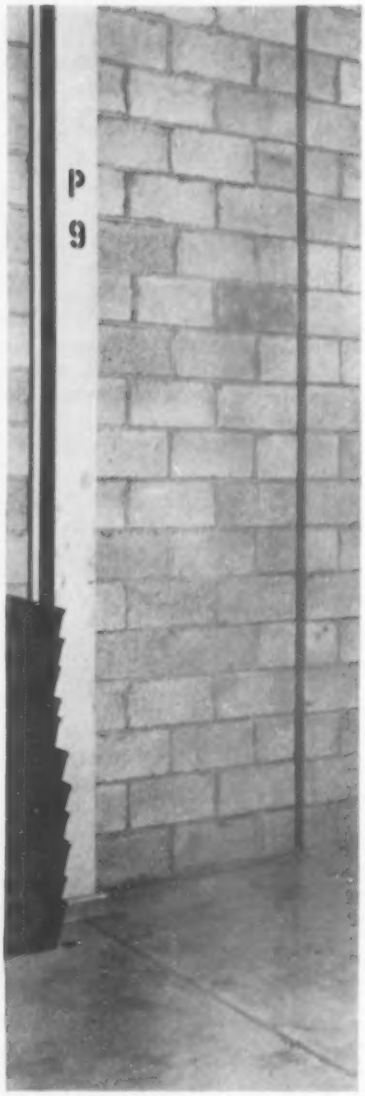
CLIFTON, N. J.

FOR CITATION AND EXTERIOR VIEW OF PLANT, SEE PAGES A-8 AND A-9

Begins on page D-6

"Building features show results of top planning..."

TWO WORTH-NOTING FEATURES are in the plating area. Floor is hard-burned brick laid and pointed with acid-proof mortar. In background, fire curtain extends to within 8 feet of floor, confining heat and fumes.



SEAMS in cinder-block wall control cracking, allow individual sections to be removed if building must be expanded.

Many building features—again as a result of the splendid planning characterizing the plant—are worth consideration by other plant operating men in planning their new plant.

. . . *The building's steel structure* is entirely independent of the outside walls. If the wall must be removed, the steelwork will be unaffected.

. . . *Because of the vibration* always associated with fast, reciprocating machine operations, the floor of each bay is isolated from its neighbors and from the columns by mastic joints.

. . . *The roof components* were designed in unbalanced lengths so that they cannot begin to vibrate "in sympathy" with machines.

. . . *A substantial reduction* in steel was effected by use of cantilever construction in roof members.

. . . *Cinderblock outside walls* are made in 40- or 50-ft. sections, with a mastic joint between (see photo above). Why? First, joints reduce the possibility of wall cracks. Second, in the event expansion of the plant is needed, sections can be individually removed, in no way weakening adjacent panels.

. . . *Employee locker rooms* are located over floor-level employee washrooms and toilet facilities to minimize loss of valuable production floor space. Heights are such that the top 4 feet of the locker rooms protrude through the roof. Windows are provided in these "semi-penthouses" to provide plenty of light and ventilating area.

. . . *Rectifier* and motor-generator housings, and other such service facilities are located in roof penthouses, completely out of the way of production and layout changes.

. . . *The cooling tower* is located on the roof directly above the heat-treat and plating area, where most of the water it cools is used.

. . . *Fire curtains* that extend down to 8 feet above floor level surround the heat-treat and plating area. In combination with powered, high-volume roof ventilators, they confine the heat and fumes almost completely. The toolroom has a similar installation in the area used for heat-treating tool steels.

. . . *The maintenance department's* "middle-of-the-house" location puts it within seconds of any production-area breakdown. And the maintenance shop includes fire-extinguishing equipment, a paint storage area, welding booths, and degreasing equipment—all in separate, walled-off areas.

Receiving area—It's full of interesting ideas. Here are four samples:

. . . *Separate docks* are used for receiving raw materials (wire, rod) and service materials (tool steel, maintenance supplies, business forms, and the like). This minimizes intra-plant materials handling, eases the materials control problem.

. . . *A deluge shower* is provided immediately adjacent to the acid-and-chemical-storage area.

. . . *The paint-storage area*, located against an outside wall, is separated from the rest of the area by a firewall. The floor is slanted towards the outside wall, which has scuppers to allow spilled paint to flow out. The doorsill is several inches above the general floor level, to prevent paint from running out into the general storage area. And the room has explosion sash, vapor-proof electrical fixtures.

. . . *The gas-meter room* has a separate roof vent, and to prevent any gas leakage from entering the plant, can be entered only through a door from the outside.

OTHER SERVICES ARE COMPLETE

A great deal of attention was paid to fire protection. Every square foot of the plant is protected. The areas housing the rectifiers, motor-generator sets, and cyanide furnaces (where water would do more harm than good) are protected by rate-of-rise alarms, vaults, and spray booths, and are provided with CO_2 systems. The rest of the plant is 100% sprinklered.

In addition, the entire plant is supervised by a proprietary system. Collapsible-type fire vents are spotted on the roof. They operate when a fusible link melts or can be opened from inside or out by manual control. There are some firewalls enclosing departments, and many fire curtains throughout the shop. And there are several major aisles, reaching all sections of the plant, that were specifically designed to be large enough for municipal fire apparatus to drive into every department.

Other interesting plant service features:

. . . *Heat is supplied* to the shop by unit heaters operating on steam at 35 psi. (Steam is generated at 125 psi., 50-deg. superheat for process purposes.)

. . . *A separate ventilation system* pulls in sufficient outside air to provide one change every 9 minutes for summer ventilation. The roof will carry a 1½-in. pond to reduce solar heat.

. . . *Battery-powered floodlights* illuminate aisles when power fails.

CAFETERIA has entrances from shop and office, seats 250, is operated by a caterer. It's bright and cheerful.

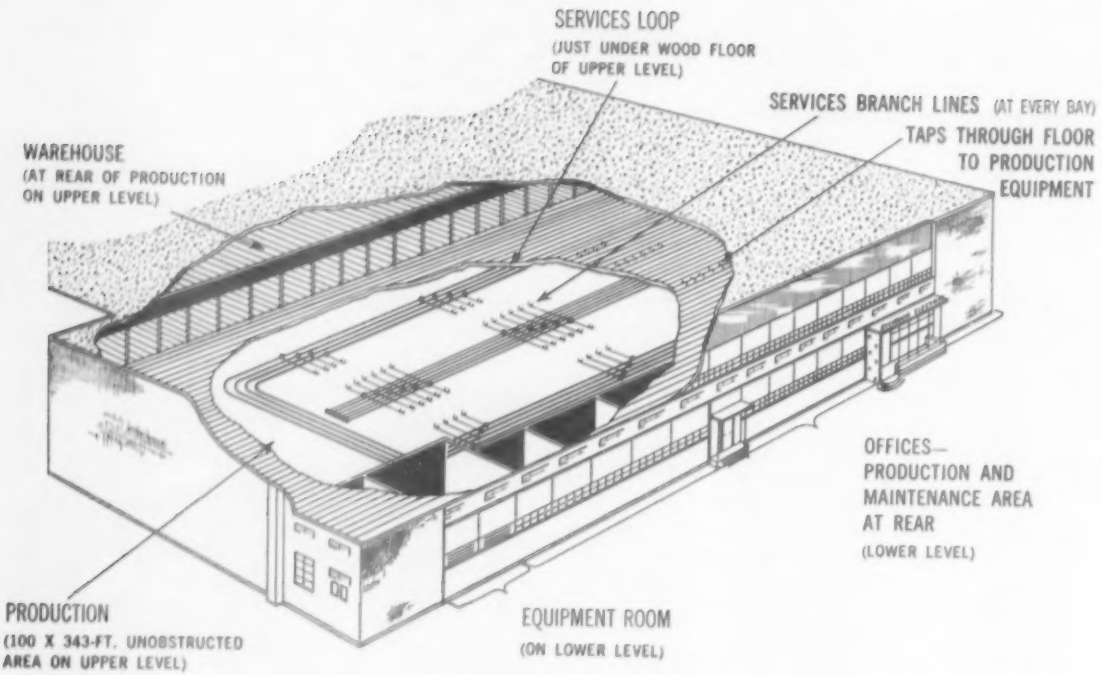
EMPLOYEE FACILITIES

There are two locker and washrooms, both centrally located to minimize employee walking. Extending from in front of one to the front of the other is what Parker-Kalon calls the "Personnel Aisle." In this aisle are all factory time clocks, beverage and food vending machines. This aisle is a smoking area, and is protected by heavy stanchions at both ends to prevent fork trucks from entering.

The cafeteria has separate entrances from both the office area and factory, and seats 250.

Transportation—Since the old plant had been in New York City, many of the present employees live there. For their convenience, Parker-Kalon has arranged direct bus service from the Times Square area to the plant—a 20-minute run—in advance of all shift changes.

There is plenty of parking space for employees who wish to drive to the plant. Space was provided in the ratios of 1 space per 2.4 shop employees, 1 space per 1.6 office employees. There's a third parking area for visitors. All parking areas are paved and marked, illuminated by flood lights.


SERVICES LOOP
(JUST UNDER WOOD FLOOR OF UPPER LEVEL)
SERVICES BRANCH LINES (AT EVERY BAY)
TAPS THROUGH FLOOR TO PRODUCTION EQUIPMENT
WAREHOUSE
(AT REAR OF PRODUCTION ON UPPER LEVEL)
OFFICES—PRODUCTION AND MAINTENANCE AREA AT REAR
(LOWER LEVEL)
PRODUCTION
(100 X 343-FT. UNOBSTRUCTED AREA ON UPPER LEVEL)
EQUIPMENT ROOM
(ON LOWER LEVEL)

PRODUCTION AREA, 100x343 feet, is completely unobstructed. Any service can be delivered to any part of it by the well-planned underfloor distribution system. Branch lines are tapped off the main services loop into every bay. Loop, directly under the ceiling of lower floor in this split-level plant, is fed from lower-level room.

Pace-Setter for Plant Services

IT WAS LOGICAL for Sylvania to build its new plant on the outskirts of St. Marys, Pa. Its old multi-story plant had been in downtown St. Marys—1½ miles away—since 1907. And over the years Sylvania had built up an excellent community relationship, a reliable and happy work force. Even though the new plant is in a deeply forested area, surrounded by beautiful countryside, it is near plenty of industrial facilities—an electrical utility substation ¼-mile away, a natural gas main and a railroad main line across the state highway, plenty of water and other services.

The decision as to what kind of plant to build wasn't so easy to make. Because Sylvania set its sights high. Company executives wanted the new plant to embrace every new design concept—they were after the most technically advanced plant of its kind. And they put three years of intensive planning and designing into the effort.

Has it paid off? Plenty. Production costs are down. Materials handling costs are down 50%. Product quality is improved. And the plant is big enough to handle double its present production needs.

While there are many features of the plant that warrant a close look, these three appear—to us, at least—to be the most interesting:

. . . *The split-level design.*

. . . *The process piping system* (diagram above and center photo, right).

. . . *The laminated wood floor* (top photo, right).

Let's look at all three. First . . .

Why split level? Because Sylvania, like many home builders, chose to make the most of a sloping site—rather than be licked by it. Front of the plant (shown in the diagram) is two stories high. But behind this section there's only an upper story, used for warehousing. Thus the warehouse and the main production area are on the same (upper) level. "Downstairs" are offices, maintenance shop, service equipment room, and some production area.

(Lower level is 384 feet—width of front of plant—

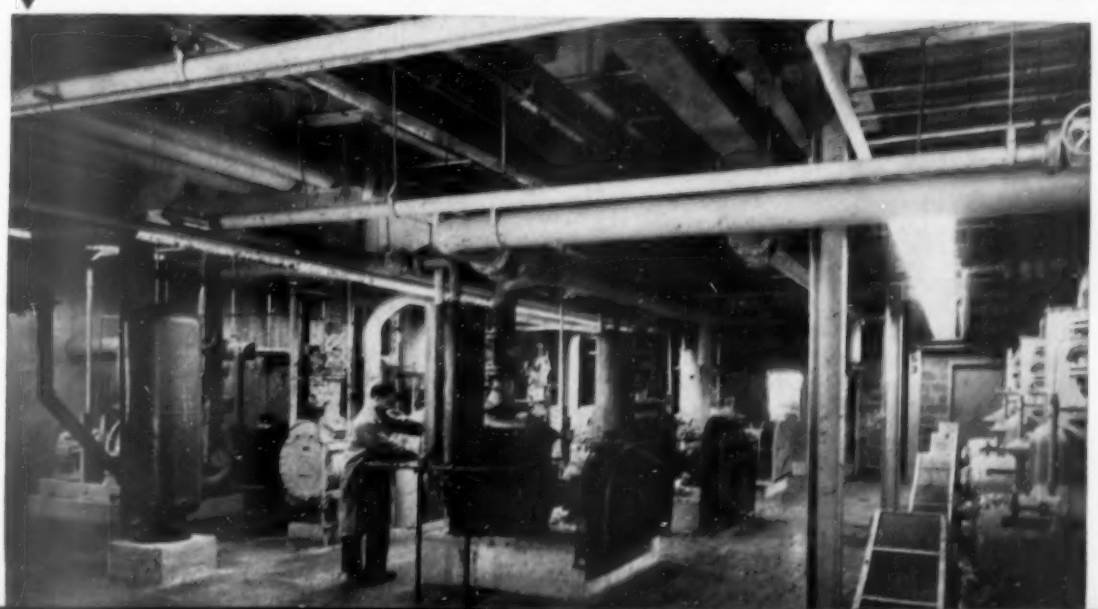
SYLVANIA ELECTRIC PRODUCTS INC.
LIGHTING DIVISION, ST. MARYS, PA.

FOR CITATION AND EXTERIOR VIEW OF PLANT, SEE PAGES A-10 AND A-11

WOODEN FLOOR in main production area above makes it easy to run service lines from production machines to service lines just below. Note louvers (below windows) and gravity roof ventilators that provide a complete air change every minute.

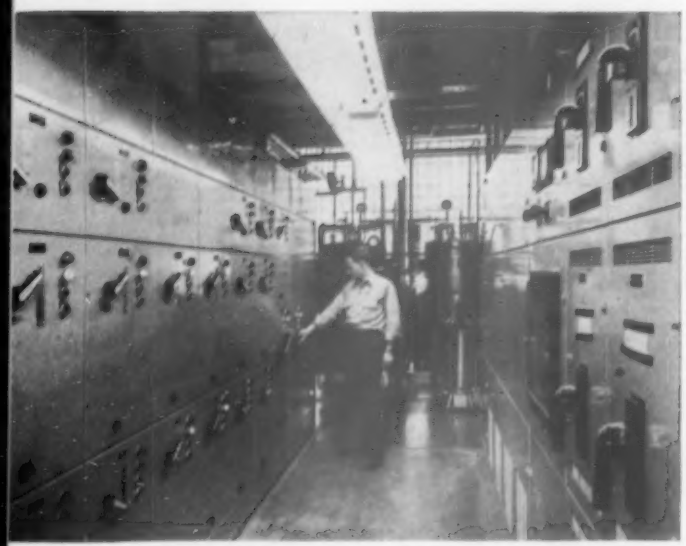
BRANCH SERVICE LINES like these at right are tapped off main service loop into every bay where the service is needed. Note that they're close under wood floor of main manufacturing area, extend up through easily bored holes.

EQUIPMENT ROOM (below) on the lower level, houses all equipment feeding the service loops—including vacuum pumps (shown here); air compressors; argon, nitrogen, oxygen manifolds; natural gas lines and meters.

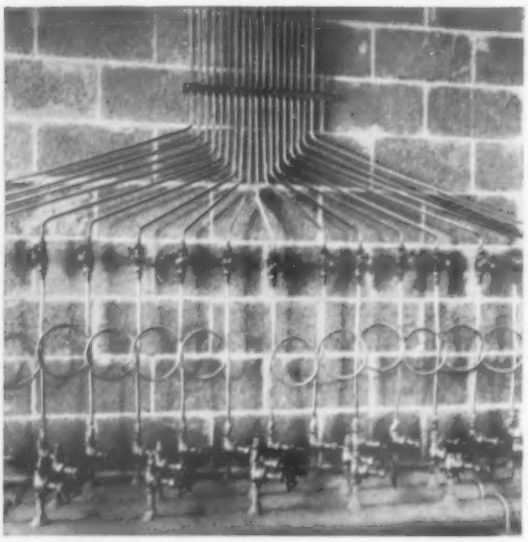


Begins on page D-10

"Top-notch equipment backs up Sylvania's system"



ELECTRICAL GEAR is also housed in equipment room. At left, one of three motor control centers. At right, 1500-kva., 4160/480/277-volt substation.



MANIFOLD SYSTEM allows any of three types of argon gas to be supplied to any of 18 feed lines simply by closing valves, connecting line to desired manifold.

by 100 feet. Main production area occupies area directly above; it has no columns or other obstructions. Warehouse extends back another 253 feet—for a total depth on the upper level of 353 feet. Total floor area: 170,000 square feet. If expansion is needed rear wall of the upper level is cinder block, easily removed.)

Process piping—It's an unusual and unusually effective arrangement. The manufacture of incandescent bulbs requires a lot of service facilities, and the Sylvania system delivers them where they're needed. All lines are sized to handle double current requirements, and—since they're so big—serve as surge tanks to keep pressure drops to a minimum, important for top-quality lamp manufacture.

All major pipe lines are located just under the floor separating upper and lower levels. The large pipe loop (diagram, p. D-10) is made up of two 10-in. and two 8-in. lines for air and gas.

Six more lines run down the center of the loop. The roster: an oxygen line, a high-pressure line, four vacuum lines (different stages of vacuum) required for different production purposes.

Branch lines are tapped off these main lines, run perpendicular to them into every bay where the service is needed (center photo, p. D-11). Diagram on p. D-10 shows how these branch lines give Sylvania absolute flexibility of production layout—there's no place on the production floor where a service can't be provided with a short branch line.

Why a wood floor? Simply because it makes it easy to bore holes through for service taps running between the production machines and the piping lines below. If any of the machines have to be moved (and some big units require 24 service lines), old holes are easily repaired, new ones drilled.

Two-by-fours laid on edge and spiked horizontally provide the strength. Cantilever construction over a 6-ft., 8-in. span provides the rigidity required. The rough floor is topped with 15-lb. felt and 33/32-in. hard-maple flooring. Allowable floor load is 300 pounds per square foot.

(This floor is used only in main manufacturing area. Lower and warehouse floors are concrete.)

BEHIND THE PIPING

Even more important than the piping system is the equipment backing it up. There's plenty of it. All located in the equipment room on the lower level (see diagram). Here's the list:

. . . *Four stages of vacuum* are generated—"B," "C," and "rough" for process use, and "utility" for mechanical operation of machines. There are three "C-vacuum" pumps, one "B-vacuum" pump, two "rough-vacuum" pumps. Smart piping design, with cross-over connections and valves, lets Sylvania protect itself with just one standby pump. Only one of the two installed utility-vacuum pumps is needed for the present load; the other is on standby. All are equipped with silencers and filters.

. . . *Air circuits* (for cooling and combustion) are fed by two 2075-cfm., one 1350-cfm. blowers, each only half-loaded, leaving plenty of capacity for future needs. Four smaller (650-cfm.) units serve as standby.

PROCESS INSTRUMENT PANEL is nerve center. If any controlled condition goes out of limits, an alarm sounds in the equipment room and on the production floor.

. . . *Three 145-cfm. compressors* produce 90-psig. compressed air. Only one is needed to meet present production requirements.

. . . *Three types of argon* (for different kinds of lamps) are used. A simple system of three manifolds —one for each type, and each with 18 outlets—permits quick change-over. Each manifold is backed up by two banks of 238-cu. ft. gas cylinders. Switch-over when first bank is exhausted is automatic.

. . . *Nitrogen and oxygen* are brought into the equipment room by a 2-in. underground line from a liquid station (not owned by Sylvania) on the site.

. . . *Natural gas*—a lot of it—is used. A 3-in. entry line is more than adequate. Metered, it's reduced to different pressures for production and service use.

OTHER SERVICES

Designing the ventilation system for any new plant isn't easy. It was doubly difficult for Sylvania. Why? For the main manufacturing department, design conditions called for one air change per minute. Not too hard to meet with power ventilating equipment. But Sylvania engineers had to accomplish it by natural circulation. How come? Because almost no air movement can be tolerated on the manufacturing floor. The slightest draft would affect critical gas flames on the production machines. Solution was 16 aluminum louvers in the front wall and two rows of continuous gravity roof ventilators right above the production machines (top photo, p. D-11).

Each of the 16 major production units (each consists of three machines—mount, sealing, and finishing) has its own exhaust blower for hot air, discharged beneath the roof ventilator.

The lunchroom is the only air-conditioned area. The 40x50-ft. room is cooled by one 5-ton unit and one 3-ton unit.

As is the case with the ventilating system, each area is heated by different units and systems, each matching the area's particular demand. But, wherever possible, natural gas is used; it's readily available at lower cost than other fuels.

Electrical distribution—It's geared to take any load production can put on it. In this new plant, Sylvania switched from 240 volts (used in the old plant) to 480 volts. Savings on equipment resulting: a handsome $22,287—though $11,000 had to be spent to convert some existing equipment. But Sylvania expects equipment savings and lower operating costs from here out. (The 16 big production machines still run on 120/208Y volts. Reason: These units have to be interchangeable with other Sylvania plants.)

Power is received at 4160 volts from the utility company substation. While there's only one line to the plant, the substation is looped, providing good assurance of continuous power.

The indoor substation (see left photo on facing page) is in the equipment room. Its 1500-kva. dry-transformer steps power down to 480/277 volts.

Power is then channeled through metal-enclosed low-voltage switchgear (which has two spare breaker positions), from there is distributed to truss-mounted plug-in bus duct. The bus blankets the shop, serves all loads in the manufacturing area except the 16 big production units. 208Y/120-volt power for these units is reduced from 480 volts by a 300-kva. dry-type transformer.

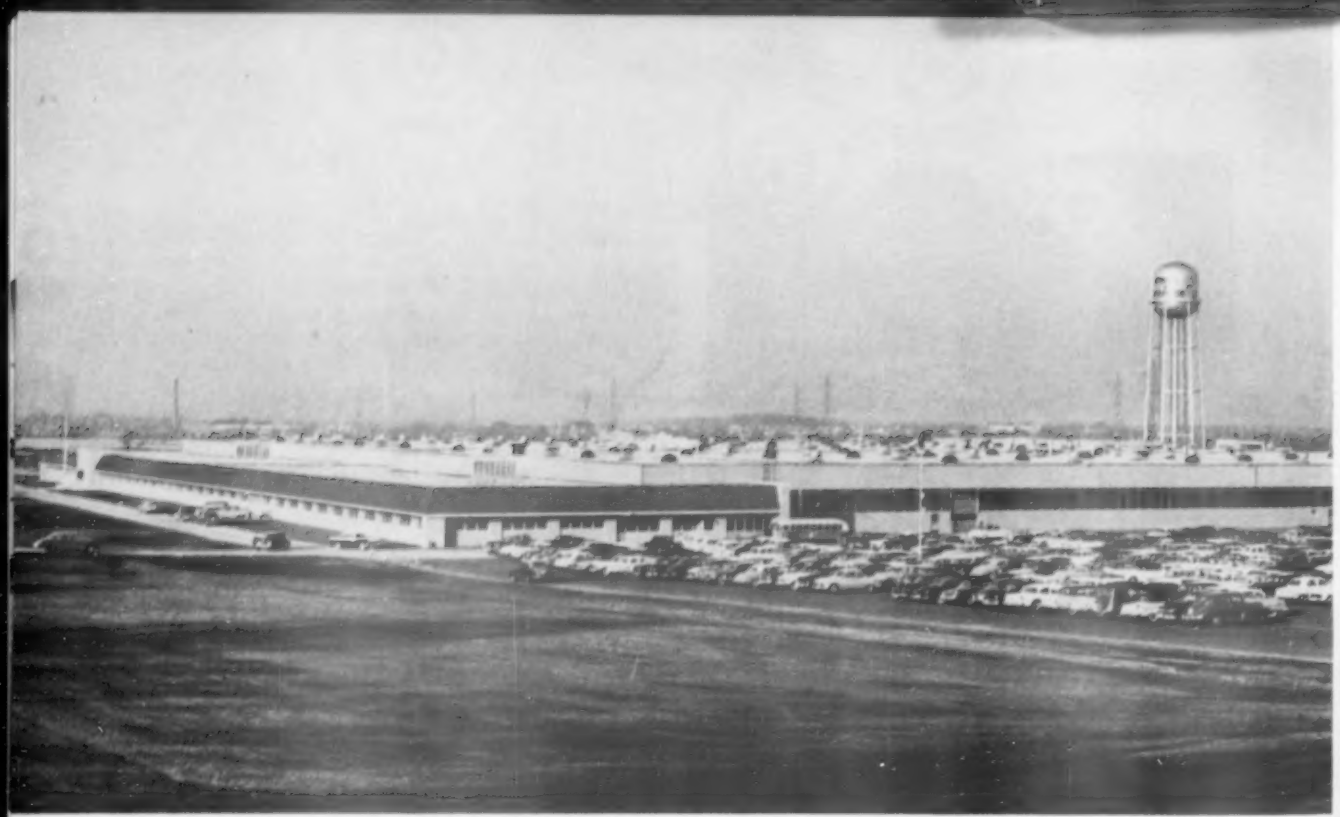
A 100-kw. gas-driven motor-generator set cuts in automatically if voltage drops below 70% of normal, cuts out when restored to 90% of normal.

Lighting in the plant is all 277-volt fluorescent—fed from the 480-volt bus. Sylvania maintains 65-foot-candles on the manufacturing floor, 80 in the maintenance shops, 50 to 80 in general offices. A photo-electric unit on the roof turns on outside lights when natural light drops to 1 foot-candle. And 20 indirect incandescent lamp fixtures line employee and main entrances to the plant.

THE BUILDING ITSELF

It's a steel-framed structure curtained with cinder block, 4-in.-brick veneered on front and both sides. It's trimmed with pebble-finished aluminum siding and sash. Vertical-grooved glass block above sash sets off front of the plant. Roof is steel deck topped with 1¼-in. glass-fiber insulation, a 15-lb. saturated-felt vapor barrier, and a 20-yr. gravel-surfaced built-up roofing. Result? A handsome, yet relatively maintenance-free exterior.

D



READY FOR ANYTHING that future production requirements may bring. From the front wall back to the water tower, the building and its services are designed for easy expandability. Three photos at right show examples.

Ready With the Best in Services

GROWING LIKE TOPSY. That old wisecrack describes perfectly the situation that Briggs & Stratton has been in for some years. Recently it outgrew the production capacity of its four plants in the Milwaukee area. So, when company executives planned the new plant pictured above, they made sure that future expansion headaches would be minimized.

There's plenty of room for additions to the 500,000-sq.ft. plant on the 83-acre site. Plans were drawn in the original design stage for an easy future expansion of between 250,000 and 300,000 square feet. And high on the list of factors that will make this "some day" expansion easy are the built-in provisions for easy expansion of the all-important plant services. For example:

. . . *Some plant service equipment* already has enough capacity for any foreseeable expansion. This is true of the water storage tank, storm-water impounding basin, waste treatment plant, feed water treating equipment, and fuel oil storage and heating equipment—all hard-to-expand units.

. . . *And, in other cases,* where it was not economically feasible actually to install the facilities that will be needed in the future, space was provided to make future installation easy. Case in point: see top photo at right.

. . . *Feeder lines* carrying services to the shop were also installed with the future in mind. All such lines (100-psi. steam, 30-psi. steam, pump discharge, storm water, well water, hot water, fire-protection water, sanitary and industrial waste, and compressed air) have stub connections at the north wall of the plant—the direction of planned expansion. Three such capped stubs can be seen in the center photo.

BRIGGS & STRATTON CORP.

WAUWATOSA, WIS.

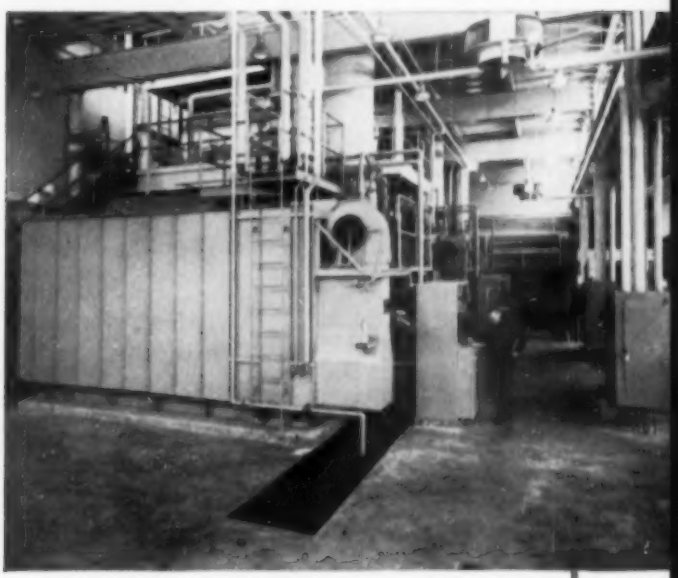
FOR CITATION AND EXTERIOR VIEW OF PLANT, SEE PAGES A-10 AND A-11

PLANT SERVICE DETAILS

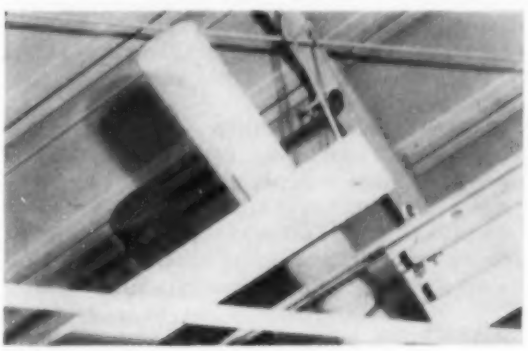
Heating—Steam is supplied at 100 psi. The main high-pressure header runs down through the trusses from the back of the building to the front. This header is tapped at many points along the run to serve the various heating and process steam systems.

Milwaukee Journal Photo

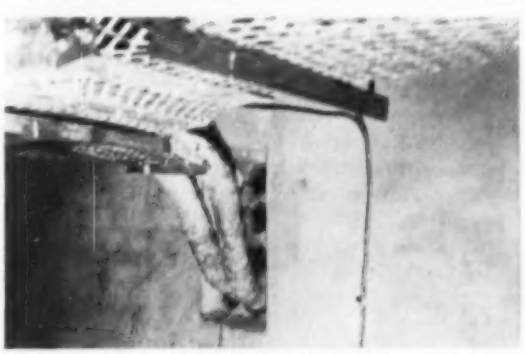
How easy expandability is built into...



...boilers Space in foreground has been provided for a fourth boiler when needed. Foundations and associated equipment are already in place.



...piping All utility feeder lines are capped at north wall of plant—for possible future expansion. Extension—when necessary—will be easy.



...ducts Adding future power-cable runs to and from master substation will be no problem for Briggs & Stratton. Empty ducts for cable are visible.

For use in the plant, steam is reduced to 30 psi. through pressure-reducing valves.

The shop area is heated by a system of thermostatically controlled overhead unit heaters. There are three types of ventilating units in the factory area—summer exhaust, summer and winter supply.

Water supply—There are two sources of water supply. Impounded storm water is used for manufacturing purposes and for fire protection. Well water is used for all other purposes. The well water is softened for boiler feed, all domestic hot-water usage, and kitchen use.

All storm water from the roof and from outside yard areas is drained through an underground piping system to an outdoor impounding basin (left photo, next page). Three electric pumps with a combined capacity of 2000 gpm. and automatic sequence and alternating control deliver the water to the mill-water system in the plant and the mill-water compartment of the elevated storage tank and into the 1500, or 2000 gpm. as needed.

Well water is pumped into the well-water compartment of the elevated storage tank and into the building piping system. Special standby provisions have been made for supplying well water direct to the steam boilers and to the mill-water pump well in the event of storm-water shortages.

The well-water pump is automatically controlled to start pumping if the water level in the storage tank drops 1½ feet below maximum.

Turn the page

Begins on page D-14

"Planning of plant services sets a high goal..."

WATER FOR MANUFACTURING and fire protection comes from the 7.5-million-gal. impounding basin. Lower compartment of elevated tank holds 200,000 gallons of pond water; upper, 50,000 gallons from well.

UNDERFLOOR FLUME (cover removed) carries coolant from machine to flotation unit. Cleaned, it's piped back.

Two systems of hot, softened well water are used for domestic requirement of the building, and pumps are used to insure circulation. Thermostatically controlled steam is used to heat water. Because of localized demand for hot water, these piping systems run only to points of use.

The elevated water tank itself (see photo above) was designed for dual service, has two separate compartments. The lower compartment is used for storage of mill water, has 200,000-gal. capacity. The lower 150,000 gallons are held in reserve at all times for fire-protection service. The upper compartment has a capacity of 50,000 gallons of well water.

Each storage compartment has an independent hot-water heater, using steam. To minimize the possibility of corrosion, a suspended cable-type cathodic protection system is installed in each compartment.

Fire protection system—Main part of the system is a wet-pipe automatic sprinkler system throughout the factory area. A separate system using diethylene glycol anti-freeze is installed for protection under the exterior loading dock canopy.

The exterior fire-protection system consists of a 10-in. valved underground fire main enclosing the entire plant. Plugged outlets have been provided for future extension of the line. Fire hydrants are spaced about 300 feet apart.

Primary water supply is drawn from the basin by two automatic fire pumps, rated at 1500 gpm. One of the pumps is electrically driven; the alternate or standby pump by a diesel engine. A small 75-gpm. electric pump maintains a constant 100-psi. pressure on the fire-protection systems.

The secondary water supply consists of a valved underground connection from the fire loop main to the mill water compartment of the elevated storage tank.

Sanitary drainage—All sanitary sewage from the building flows by gravity to the public sewer.

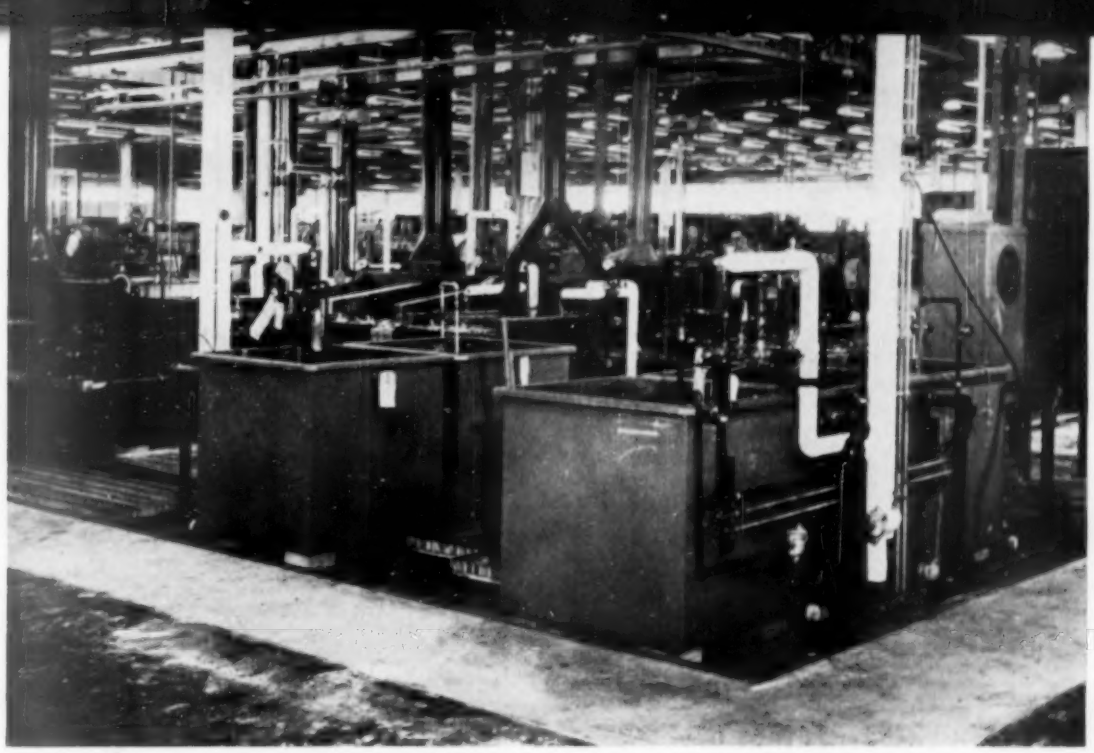
Industrial waste—Special inlets at floor level are provided at any location in the shop where oil, grease, or other industrial waste must be removed. A complete under-floor drainage system carries the waste to a large oil separating trap outside the building limits, then to the main sanitary drain.

Compressed air—Air for all plant use is compressed to 100-psi. pressure in the boiler house, and distributed through a modified grid-loop system with piping on close centers for complete building coverage.

Electrical distribution—Power for the operation of production equipment, pumps, roof fans, compressors, and similar equipment for heating, ventilating, and plumbing system is provided by runs—on 80-ft. centers throughout the shop—of 600-amp., 440-volt plug-in bus duct. Additional runs of 600-amp, and a few of 100-amp. bus are provided in areas where load concentrations are high.

Power for heavy loads such as boiler auxiliaries, large air compressors, and pumps is supplied at 440 volts, by direct cable runs.

Power is supplied to these bus duct and cable runs in overhead conduit from five double-ended unit substations, each with two 1500-kva., 13,200/480-volt dry-type transformers. Total transforming capacity: 15,000 kva. Tie-lines between secondaries permit at least partial service to all feeders in the event of transformer or cable failure.



PLATING DEPARTMENT FLOOR is hard-burned brick impregnated with non-slip material. Brickwork, laid over structural slab, is bedded and jointed with acid-proof mortar. Floor in rest of manufacturing area is wood block over reinforced concrete, insuring employee comfort and trouble-free use under heavy trucking operations.

Power is supplied to the substations from the switchgear by an underground duct and manhole system.

The primary switchgear is metal-clad, totally enclosed. It has two main air circuit breakers controlling service from each of the outdoor transformers, and, through feeder breakers, to the various unit substations. A tie-breaker permits connection of the entire load to either of the two outdoor unit-substation transformers.

The primary outdoor main substation itself is fed by the power company's 26,400-volt overhead line. Two 5000/6250-kva., oil-cooled transformers reduce the voltage to 13,200 volts for primary distribution. A separate underground main feeder is run from each transformer to the primary switchgear.

Lighting fixtures throughout the factory area are fluorescent, suspended from trolley duct for flexibility. Light levels are maintained at 60 foot-candles in production areas, 45 foot-candles in general areas.

BUILDING FEATURES

Plenty of layout flexibility was built into the plant which has 40x60 ft. clear-span bays, with a clear height of 16 feet to the underside of the trusses.

Exterior walls of the manufacturing area are brick to sill height. And above the continuous band of 8-ft.-high aluminum sash, aluminum panels are used. Few maintenance problems here. Sash on the south and east elevations are glazed with heat-resisting and glareproof glass. To overcome the objectionable glare on the west exposure—the office side or front of the plant—sash is only 4 feet high, and a continuous overhanging canopy is used to block out the sun.

Employee facilities—Locker rooms and cafeteria are located—along with the general offices—in the front of the building. The cafeteria has an asphalt tile floor, colored tile walls, and acoustic ceiling. It will accommodate 550 persons at a time, includes two hot-food serving counters and one snack bar.

A 9600-sq.ft. drafting and engineering design room is in this area. Throughout the 9000-sq.ft. office area, asphalt tile floors, plaster walls, and acoustic ceilings are used.

The truck well for receiving raw materials has six docks; the shipping well, eight. Both are totally enclosed, equipped with hydraulic levelators. Blast heaters, interlocked with the powered doors, prevent cold Wisconsin air from making life uncomfortable in the winter.

LOCKER ROOMS, like all other employee facilities, are located along front of building. In photo you can see tile floor and walls, which make maintenance a "damp-rag" job.

PLANT SERVICES

Special Awards

. . . awards made to plants that are outstanding in some one respect, or in which there is an unusual feature of broad significance.

What "Easy Maintenance" Means

In the questionnaire sent to all candidates for Significant Plant Awards, question 7 was: "What features are designed to make plant and/or equipment easy to maintain?" We've seldom seen a better answer than the one sent us by Shell Oil Company's Anacortes (Wash.) refinery. It's given, almost verbatim, below. And we'll bet you've seldom heard of anyone who's put this kind of emphasis on making maintenance easy.

It's to be expected of a refinery? Maybe, but with one possible exception—item 9—we see nothing that is not applicable to any plant.

Here, Shell reports, are the features that provide for ease of maintenance:

1. Equipment handling facilities, including structures, cranes, and hoists, are permanently installed.
2. Major equipment is spaced for accessibility.
3. All equipment above grade level is supplied with platforms, stairs, and ladders.
4. All roads, accessways, and process areas are paved, to facilitate materials handling.
5. Stand-by spares are supplied for all critical machinery, to minimize downtime.
6. Complete and integrated central maintenance shops and store houses are available for repairing all equipment.
7. Four zone maintenance shops for rapid minor repairs are spaced throughout the refinery.
8. All piping is installed above ground level with the exception of major water lines.
9. Units are designed to permit by-passing and isolating equipment components for maintenance while unit is "on stream."
10. Spare parts are stocked for critical refinery equipment.
11. Elevators for personnel and materials are installed in high structures.
12. Maintenance steam, water, air, and welding outlets are provided throughout the refinery and on structures.
13. Alloy materials are used extensively in the design of units, to minimize maintenance.
14. Units have been designed and arranged so that detailed planning of manpower and equipment will greatly reduce the cost and time of unit shutdowns. Extensive radio and public address systems are installed for dispatching of materials and manpower used on repair work. Mobile equipment adequate for handling all personnel and materials is provided.
15. Inspection equipment of the most modern type is provided to enable inspectors to anticipate and plan replacement of equipment before the processing units are shut down for maintenance.

Further, Shell reports, the administration, personnel, and control laboratory buildings have exterior walls of pre-cast stone panels, and all sash, doors, and the like are aluminum. Interior partitions in the lab are largely structural glazed tile. Floors in all buildings are concrete, covered with asphalt tile; ceilings are generally finished with acoustical tile.

The two shop buildings, and the stores and warehouse building, have steel frames, with exterior walls of pre-cast concrete panels and transite. All exterior doors are steel, all sash is aluminum. The interior walls of the shop building are salt-glazed tile to wainscot height. Floors are asphalt tile, and ceiling acoustical tile in offices and corridors. In all, building materials that are easy to maintain.

At this point, will you buy our statement: This is what easy maintenance means?

Extra we liked: A "Keep Washington Green" theme was followed throughout the planning and construction. Trees and shrubs, wherever possible, were spared. And the storage tanks are painted—you guessed it—a tree-color green.

Shell Oil Company, Anacortes, Wash.

In-Plant Feeding Made Easy

No use to break your back (and your bank) to provide in-plant feeding for workers. Not if you follow the lead of G-E's Specialty Control Department. Its plan is just the thing for a small plant faced with the always bothersome cafeteria problem.

Over 20 machines are used to dispense all food automatically. They serve up to 200 people in less than 10 minutes. And even make change. They're lined up against three walls of the cafeteria, are encased in an attractive uniform front that matches the green motif of floors and walls.

The menu: sandwiches (10 different kinds), salads, pastries, desserts (such as gelatin and bread pudding), fried chicken, hard-boiled eggs, hot soup, milk (plain and chocolate), hot coffee and hot chocolate, fresh fruit, cookies, crackers, soft drinks. Newest additions: hot roast beef sandwiches, hamburgers, frankfurters.

Added cafeteria attractions: air conditioning, tiling, and nine loudspeakers through which music flows continuously. Plus space to accommodate meetings of up to 400 employees.

Gains provided by the vending machines include: complete cleanliness, fast feeding, round-the-clock availability, and low overhead. (No employee needed to run it. No company subsidies required. The cafeteria actually turns a small profit that's used for employee recreation.)

No capital investment for kitchen, hot tables, etc. (Machines are valued at $30,000. They're owned by the Macke Company, operated by two uniformed Macke attendants.)

Specialty Control Department, General Electric Company, Waynesboro, Va.

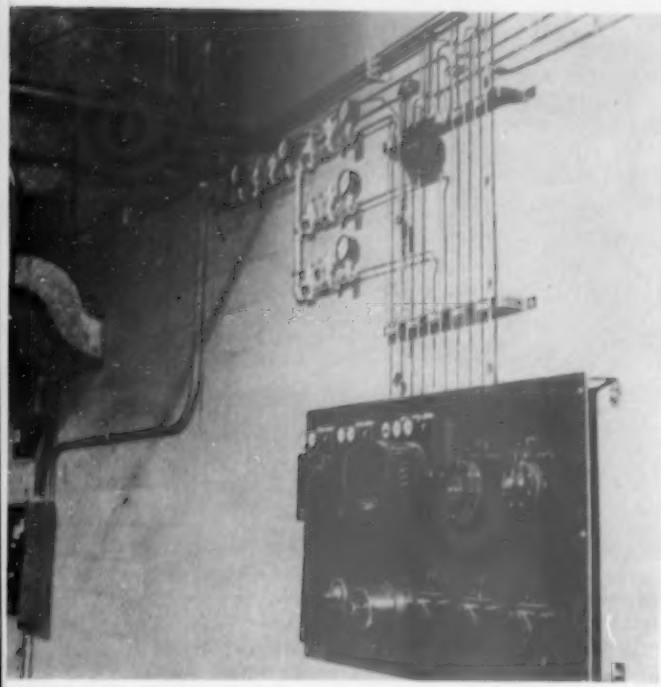
Cafeteria With Elegant "Feel"

No candlelight, no soft-spoken waiters. But that's about all that's missing from this employees' cafeteria in Western Electric's brand-new plant. Framed wallpaper murals adorn the walls. Noise is softened by acoustical hung ceilings. Walls are a deep, warm green that contrasts pleasantly with neutral-colored floors and ceiling. The pattern of dark squares on the floor is ornamental—and utilitarian, too, because it fixes the location of tables. Air conditioning provides year-round climate comfort.

Yet nothing impairs efficiency. The dining area seats 758. The mezzanine accommodates 80 more. Some 3000 can be served in 1½ hours. The serving area (left rear) is laid out on "supermarket" lines, with several different positions offering the same foods.

Western Electric Company, Inc., Radio Division, Winston-Salem, N. C.

D



Cut-Rate Heating and Cooling

How would you like to have both summer cooling and heating in your plant for $1.65 per square foot —total installed cost? That's just what The Daven Company got, at what almost everyone would call a bargain-basement price for a plant located in New Jersey's far-from-placid climate. (Note: This is not, in the strict sense of the word, an air-conditioning system—since no provisions for humidity control were provided in the system.)

What's the secret? There are several. First, the system uses the same piping set-up to distribute both hot and cold water to the air-handling units. Second, the change-over process is accomplished by a simple arrangement. And third, 140 of the 200 tons of refrigeration needed to cool the 63,000 square feet of factory and office space is supplied by 55-deg. well water. (The well cost is included in the $1.65 cost, incidentally.)

Here's how the system works. In the winter, hot water is generated in the boiler room, and circulated, by a closed system, through five air-handling units and wall baseboard convectors. (The convectors are used to "re-inforce" the air-handling units in partitioned areas.)

In the summer, cold water is circulated through the same piping system through the five air-handling units. Cold water for the system is drawn at 55 F. from the well, is cooled to 49 F. by a 60-ton chilling unit.

When the water has passed through air-handling units, it is discharged to the ground at a temperature of about 75 F. The cost of operation during the cooling season: less than $2000. And design conditions during the summer: 80 F., combined with 50% relative humidity.

During the spring and fall, when air circulation is the only requirement, 100% make-up air is circulated through the air-handling units. This can be done with hot or cold water, or no water, in the pipes, depending on the conditions desired. It is not, for obvious reasons, possible to cool one area and heat another simultaneously.

Interesting sidelight: In order to reduce the load on the air-cooling system during the summer, the roof of the plant will be flooded during the hot months.

Change-over from winter to summer is done manually. Automatic control of cooling water, fans, and make-up air dampers is provided by the simple, bare-necessity instrument group shown in the photo.

The Daven Company, Livingston, N. J.

Every Comfort for Truckers

Not every company thinks about keeping truck drivers happy when it plans a new building. But this company did. Result: Drivers who back their trucks up to the loading dock at Mead Johnson's new plant find everything they need right on the spot.

What, for instance? Well, just look at the photo. A coin telephone to the left as they enter—to check back on delivery or pick-up orders, get further routing instructions from home base, etc. A shipping and receiving clerk a half-dozen steps from the door. Water cooler a few steps beyond the clerk's office. And, through the paneled door (right), the entrance to a fully equipped truckers' washroom. For hungry drivers, a candy-vending machine to the right as they enter. And, for drivers who have run out of smokes, a cigarette-vending machine.

Mead Johnson & Company, South Plainfield, N. J.

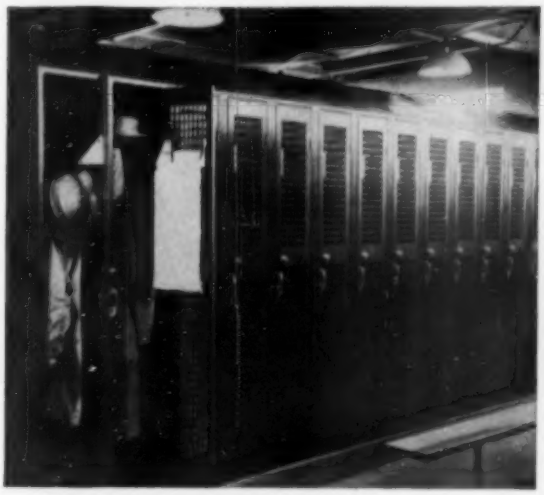
New Twists in Air Conditioning

This man is doing maintenance work on a packaged air conditioner that spills climatized air into offices on the other side of the wall. Easily removable doors give quick access to this and other office units *from the hall,* so that he can do his job without disturbing office personnel.

The three units in the photo are some of the 84 packaged units in this new G-E plant. Built-in thermostats control temperatures. Units are connected to two feeders from a single substation. Feeders have low-voltage trips, with adjustable timeclocks that open and close breakers at pre-set times. Two more timeclocks on the control panel regulate circulating pumps and cooling-tower fans, start them up ahead of the air-conditioning units.

Industry Control Department, General Electric Company, Roanoke, Va.

Two Lockers for Everybody



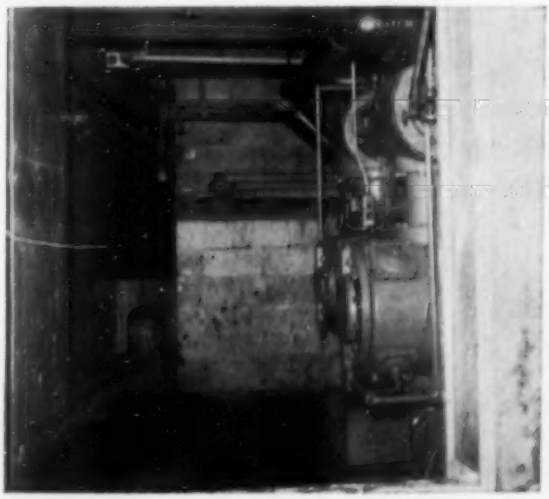
Every worker who needs them has two lockers in this new plant—one for work clothes, the other for street clothes. Why? To protect street clothes from stain, dirt, and odor contamination.

In the future, when work force grows to expected size, lockers on one side of the room will be for work clothes; on the opposite side, for street clothes. But for the present, lockers are installed on only one side of the room and employees are assigned an adjacent pair.

Locker doors are metal grill. To ease housekeeping, locker tops are steeply sloped and lockers are mounted on a 6-in. concrete base. Mechanical ventilating-heating duct systems change air 10 times an hour in locker room and adjoining shower room.

Silicones Division, Union Carbide and Carbon Corporation, Long Reach, W. Va.

No Floor Space Lost Here



Not in this new building—an addition to an existing multi-building plant. That's because the air compressor is installed in a basement that adjoins the utility tunnel system—not on the plant floor. What's more, the compressor for the new building (where coils are manufactured) is interconnected through a 2-in. header with air lines from two identical compressors in a nearby building.

Air lines are built up in 2-in. header loops. They run through the utility tunnel. Each loop serves about 58,000 square feet of the building. Branch lines through areas where compressed air is used are taken off the headers. Branch lines are ¾-in. size, never longer than 25 feet. (Compressors deliver 486 cfm. each, are driven by 75-hp. motors that develop 450 rpm.)

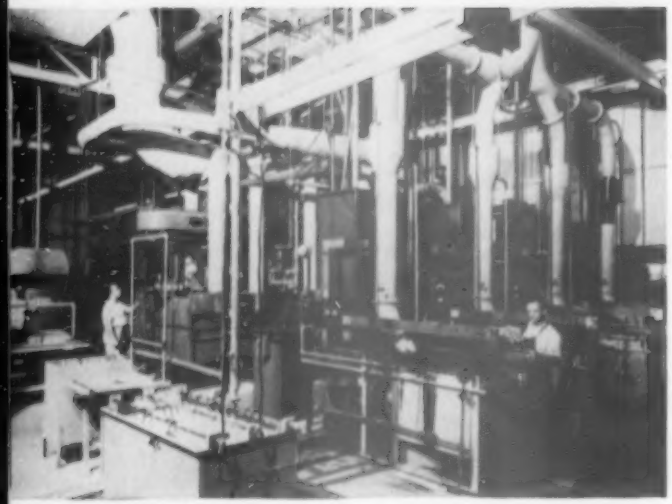
The Trane Company, La Crosse, Wis.

Need Lots of Water?

This plant did. Five millions gallons a day. Quite an order. But it's met handily by two Ranney Water Collectors—one of which is pictured at left. One delivers 2.15-million gallons per day; the other, 2.75-million. These units each consist of a vertical concrete caisson sunk in the earth to the depth of the water-bearing stratum, collecting pipes that fan out horizontally from the base of the caisson.

Silicones Division of Union Carbide and Carbon Corporation uses this system in spite of the fact the Ohio River is less than a mile from the plant. How come? Water from the wells is relatively constant in temperature, and free of organic matter—which the river water is not. You'll find all the details in next month's FACTORY (May, 1956).

Silicones Division, Union Carbide and Carbon Corporation, Long Reach, W. Va.



Good, Clean, Smart Design

The three pictures shown here were chosen from many in an attempt to represent the over-all excellence of Schick's new plant. The office area (left photo above) is bright, cheerful, and easy to maintain. Continuous rows of fluorescent lighting units maintain 50 foot-candles. Small but neat touch: wood paneling applied to columns.

In spite of the complexity of plant services throughout the shop, they're arranged everywhere in an efficient, organized pattern. In the electroplating area (left), all vapors and heat are either vented direct to the outside through ducts like these, or are trapped by draft curtains surrounding the area, exhausted by a 23,000-cfm. roof fan.

Mezzanine locker facilities (above) are spotless, easy to keep that way—thanks to extensive use of tile.

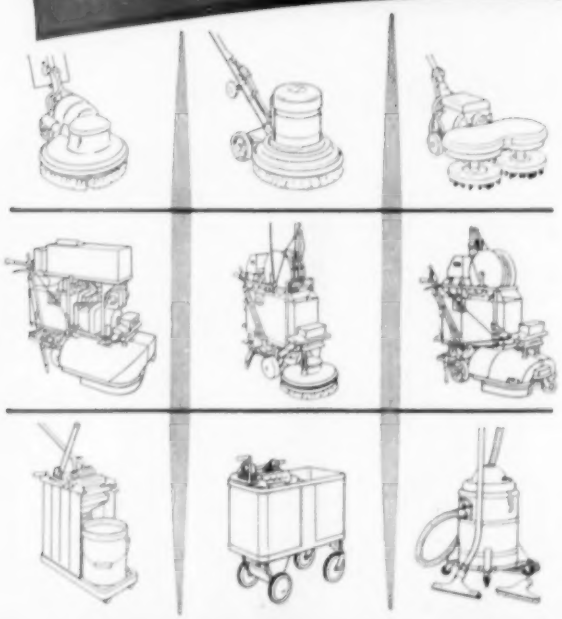
Schick Incorporated, Lancaster, Pa.

Keep your floor-maintenance men happy . . .

with *Job-Fitted* EQUIPMENT!

Choose from the COMPLETE *Finnell* Line

More than a score of models and sizes permits selection of the equipment that's exactly right for your job!



However much a maintenance man may want to do a good job, and at the same time show savings in labor costs, he's *stymied* if the machine is too small, or too large, or is otherwise unsuited to the job. Different floors and areas call for different care and equipment. That's why *Finnell makes more than a score of floor-maintenance machines.* From this complete line, it is possible to choose equipment that is correct in size as well as model . . . that provides the maximum brush coverage consistent with the area and arrangement of the floors.

Finnell makes *Conventional Polishing-Scrubbing Machines* in both concentrated and divided-weight types, each in a full range of sizes . . . a *Dry-Scrubber*, with self-sharpening brushes, for cleaning grease-caked floors . . . *Combination Scrubber-Vac Machines* for small, vast, and intermediate operations, including gasoline as well as electric models . . . *Mop Trucks* . . . *Vacuum Cleaners* for wet and dry pick-up, including a model with By-Pass Motor. In addition, *Finnell* makes a full line of fast-acting *Cleansers* for machine-scrubbing . . . *Sealers* and *Waxes* of every requisite type . . . *Steel-Wool Pads*, and other accessories — *everything for floor care!*

In keeping with the *Finnell* policy of rendering an individualized service, *Finnell maintains a nation-wide staff of floor specialists and engineers. There's a Finnell man near you* to help solve your particular floor-maintenance problems . . . to train your operators in the proper use of *Finnell Job-Fitted Equipment and Supplies* . . . and to make periodic check-ups. For consultation, demonstration, or literature, phone or write nearest *Finnell Branch* or Finnell System, Inc., 2504 East St., Elkhart, Ind. Branch Offices in all principal cities of the United States and Canada.

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Originators of Power Scrubbing and Polishing Machines

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Looks like there'll be no more water cooler repairs around here.

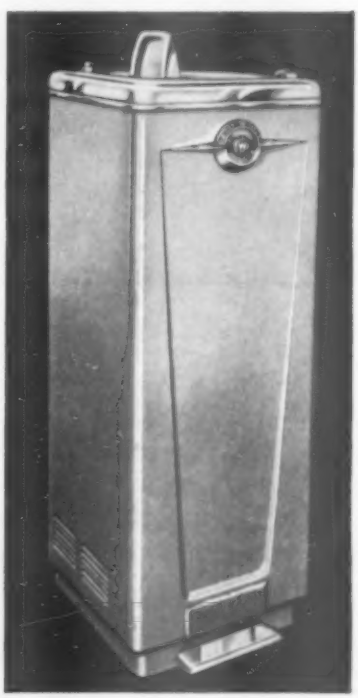
That's for sure . . . the new ones are trouble-free
WESTINGHOUSE WATER COOLERS

New Westinghouse valve ends all water leaks . . . cuts maintenance costs!

Leak-proof Solenoid Water Valve in sealed water circuit seals water in, trouble out! Reduces wear and tear . . . slashes repair costs . . . assures you more years of service-free use.

What's more, only Westinghouse offers you *all* these other efficiency features: *Dual Electric Control* for both finger tip and toe tip use—at no extra cost. *Automatic Stream Height Regulator* for no-spurt, no-splash drinking. *Patented Pre-Cooler* and Super Sub-Cooler for up to 60% more capacity. *Hermetically-Sealed Refrigeration System* for the surest cooling system money can buy, backed by a 5-Year Guarantee Plan. Handsome, rugged, *space-saving cabinet* that takes up only 14" x 14" floor space.

Don't repair . . . replace your obsolete water coolers with Westinghouse. There's exactly the right type and size for every requirement. Call your Westinghouse Water Cooler Distributor today. He's listed in the Yellow Pages of your telephone directory. Or write to the address below for your free copy of "How To Judge A Water Cooler" . . . the booklet that shows you why Westinghouse is your best buy.



YOU CAN BE SURE . . . IF IT'S

Westinghouse

Westinghouse Electric Corporation, Electric Appliance Division, Springfield 2, Massachusetts

Here's DU PONT COLOR CONDITIONING at work . . .

It's the Scientific Painting Plan that Increases Production, Promotes Safety and Improves Employee Morale

BY USING the right colors in the right places, Du Pont Color Conditioning helps improve working and living conditions in many special ways.

In work areas and offices, Du Pont Color Conditioning increases efficiency and minimizes visual strain and fatigue. Accident rates are reduced because this scientific painting plan improves visibility and points up danger zones.

In cafeterias, wash rooms and recreation areas, Color Conditioning creates a pleasant, cheerful atmosphere—improves employee morale. Du Pont Color Conditioning puts color to work to make people see better, feel better and work better. It is being effectively used throughout the country in industrial plants, office buildings, hospitals, schools, apartment buildings, restaurants and stores.

Color Conditioning costs no more than ordinary maintenance painting. Discover the many ways Du Pont Color Conditioning can work for you. Mail the coupon today!

FREE New 28 Page Book! *See how Color Conditioning can meet the needs of your building interiors.*

World's Largest Universal Testing Machine! Giant universal tester towers 60 feet over head of technician in foreground. It can squeeze or stretch with a force of 5,000,000 pounds. In operation at Lehigh University, it's completely finished with Du Pont Color Conditioning Paints.

Du Pont Color Conditioning Paints Are Now Odorless

Now you can paint busy areas without interrupting normal routine

DU PONT

REG. U.S. PAT. OFF.

BETTER THINGS FOR BETTER LIVING
. . . THROUGH CHEMISTRY

E. I. du Pont de Nemours & Co. (Inc.)
Finishes Division, Dept. F-64
Wilmington 98, Delaware

Gentlemen:
Please send me, at no extra cost, your 28-page book, "Du Pont Color Conditioning."

Name_____

Title_____

Address_____

City and State_____

Save work space—save worker's time—with

NEW KIMWIPES DISPENSERS

Save money, too, with Kimwipes in the new Dispenser-Pack

KEEP work area clear—put wipers within time-saving reach—with these new Kimwipes dispensers. They're all metal—equipped with a lock and key. Hold the new economical Dispenser-Pack of 200 Kimwipes. And these new dispensers serve workers one wiper at a time—not a wasteful handful. Ask your supplier about these new Kimwipes dispensers. Or write to Kimberly-Clark, Dept. F46, Neenah, Wisconsin.

Kimwipes are softer! Kimwipes conform better to any surface. No stiff creases to streak or scratch. Kimwipes wipe clean without linting—give you up to 10 times more wiping area for your dollar than laundered cloth.

Kimwipes are more absorbent! Hold up to 8 times their own weight in liquids. And Kimwipes are completely disposable — no holdover of infectious materials to cause dermatitis.

No other disposable wipers can wipe so clean so fast!

Kimberly-Clark
INDUSTRIAL WIPERS
Kimwipes

Kimberly-Clark Corporation • Neenah, Wisconsin

LQ600

NEW HIGH STANDARDS OF VALVE PERFORMANCE!

Fig. LQ 600
150 lb. S. P.
300 lb. W. O. G.
*patented alloy

Wherever bronze globe valves are used, LQ600 has been setting and breaking new performance records . . . in petroleum, paper, chemical and in power and industrial installations generally. *There has not been one reported case of leakage or failure* of an LQ600 Valve—even on "killer" services where the valves LQ600 replaced were lasting only two weeks to two months.

There's a surer way to low-cost efficiency than replacing or regrinding seats and discs and repairing leaky valves. *Brinalloy* seats and discs in LQ600 Valves do not need replacing or regrinding.*

Write for Circular 602, available from your Lunkenheimer Distributor or from The Lunkenheimer Co., Box 360, Cincinnati 14, Ohio.

L-256-39

LUNKENHEIMER
QUALITY

BRONZE • IRON • STEEL • PVC

LUNKENHEIMER

THE Great NAME IN VALVES

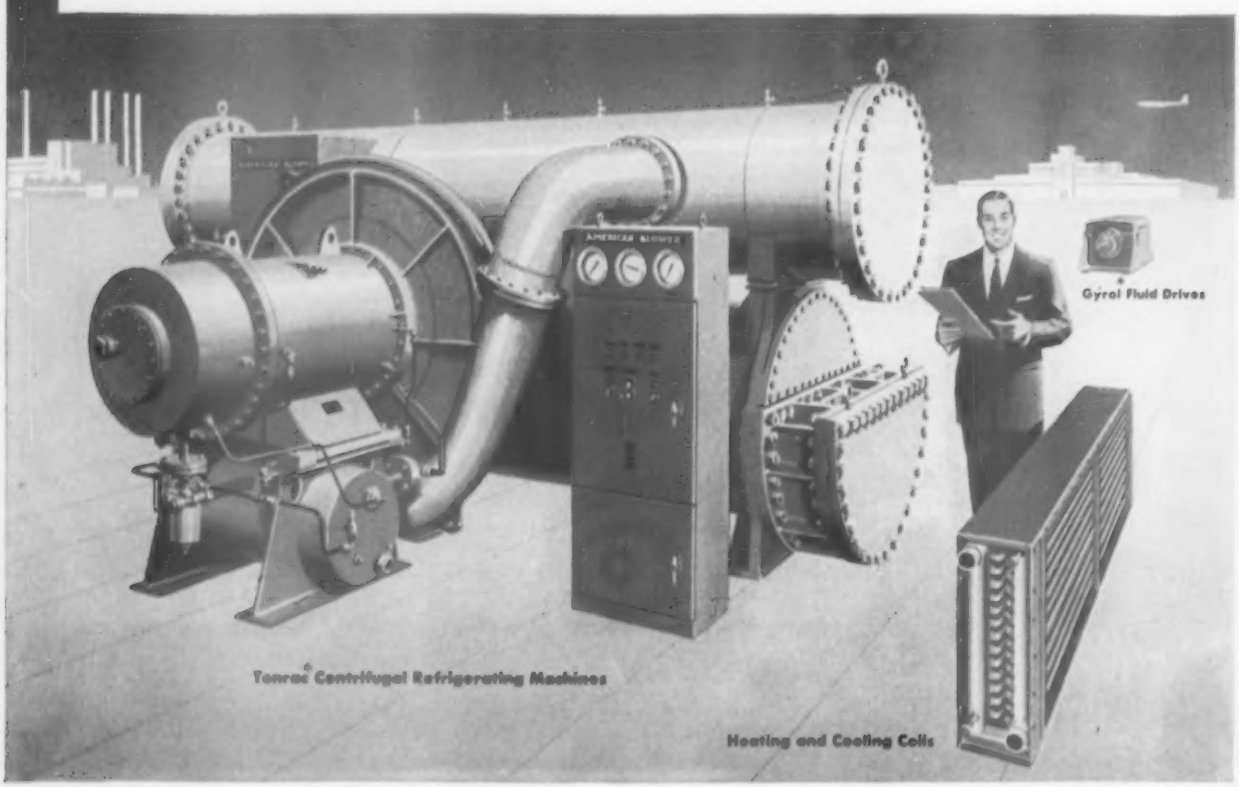
How to pick the right air condition

First: Call in an expert. There are more than 300 of them on our staff . . . skilled American Blower factory and sales engineers from all parts of the country. Each has the know-how and experience to help you select and apply the exact equipment you need—whether it's for a large-scale central or zone system, or a system for a smaller store, showroom, or industrial plant.

Second: Buy dependable equipment. A complete range of individual air conditioning, air handling, heating, and cooling components is available from American Blower to provide the last word in indoor comfort conditioning . . . products which are designed, engineered, and manufactured to work together . . . products which have proved dependable and efficient in thousands of important installations in all parts of the world.

Call in an American Blower sales engineer to help you pick the right air conditioning equipment for *your* business. Buying from a

* Trademark



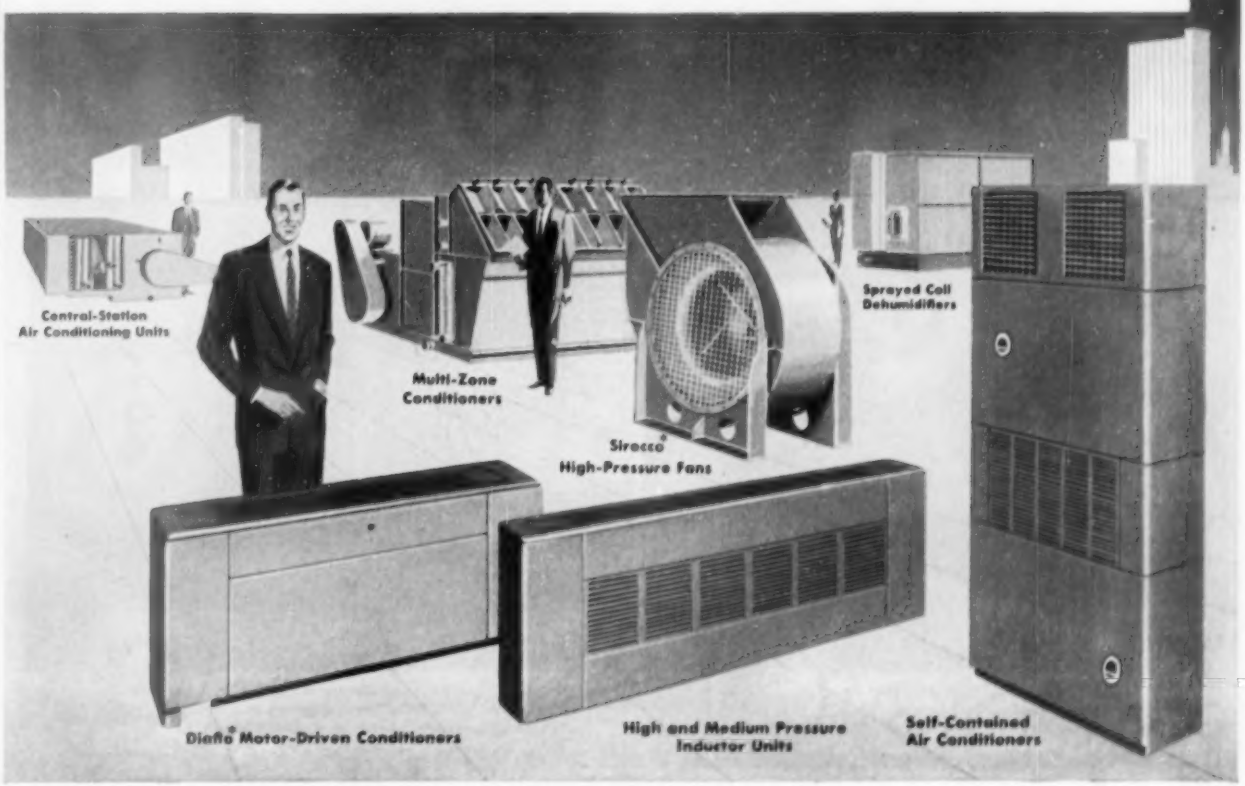
ing equipment for your business

single source gives you a balanced system; pinpoints responsibility for quality, performance, delivery dates . . . saves you time and money. Just get in touch with your nearest American Blower branch office—or, in Canada, your Canadian Sirocco branch office.

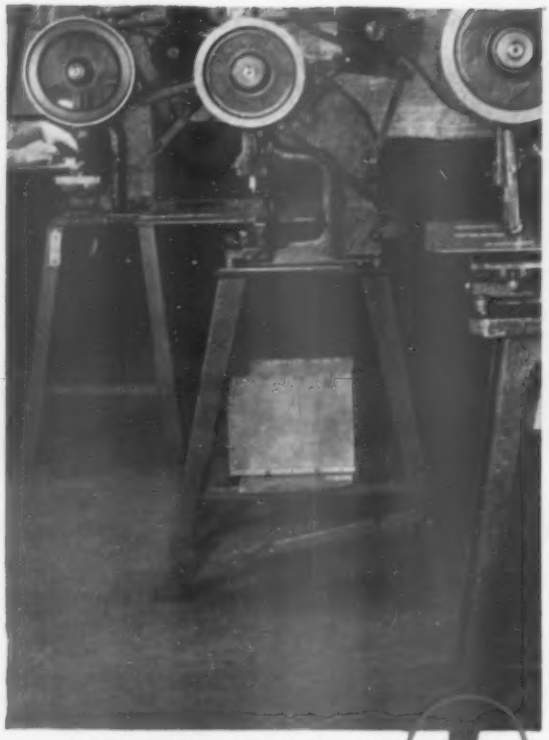
AMERICAN BLOWER CORPORATION, DETROIT 32, MICHIGAN
CANADIAN SIROCCO COMPANY, LTD., WINDSOR, ONTARIO
Division of American-Standard

AMERICAN 75TH ANNIVERSARY YEAR BLOWER

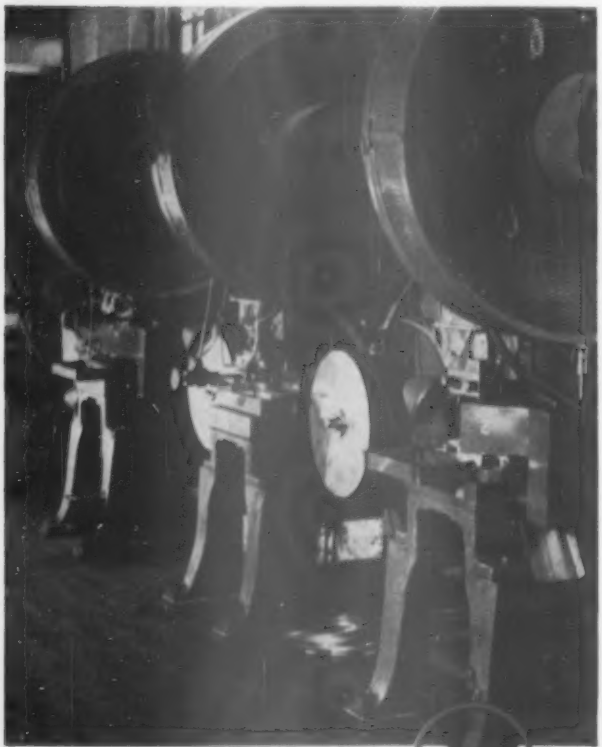
Air conditioning equipment for every business



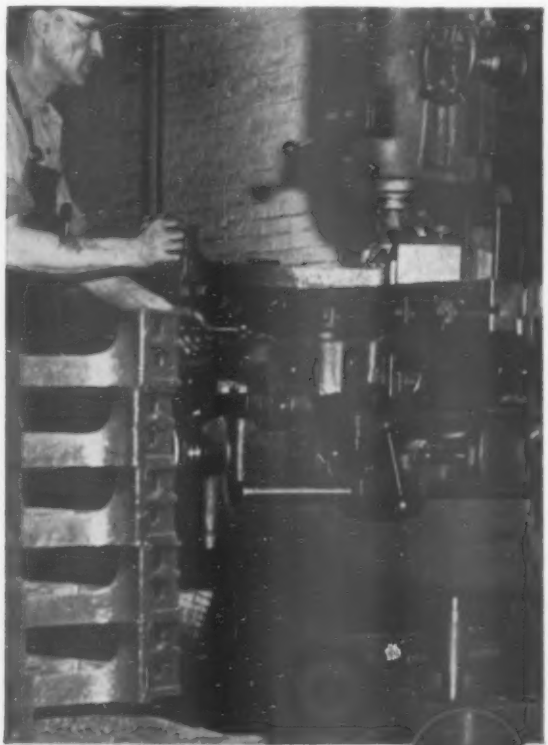
Unisorb firmly anchors Inclinable Presses at a machine company, plus making it easy to change production lines by moving machinery.



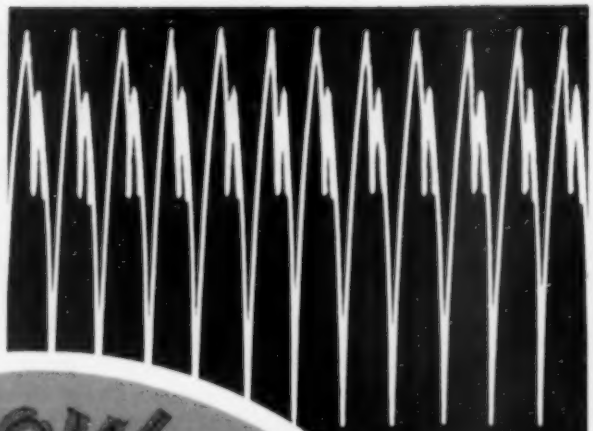
Unisorb has made it possible for this machine company to save 75% in time and labor on installing and positioning machinery.



Big heading machines are mounted on *Unisorb* without bolts or lag screws — no tightening or replacement required.



Unisorb has cut average installation time of new machines to two hours at a big electrical manufacturer — saving time and labor.



MACHINES WITHOUT UNISORB

NOW

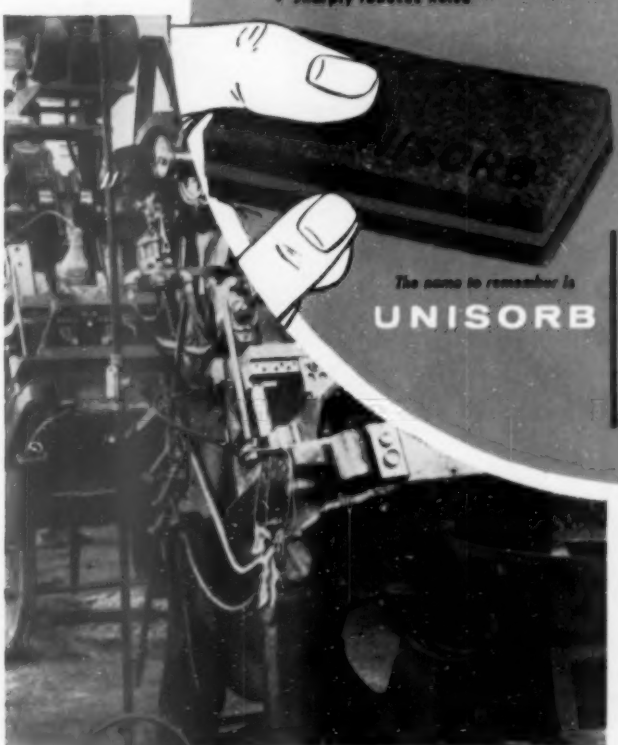
A Special Type of UNISORB for every size Machine

Exclusive red center cushion-control available in loading ranges from 3 to 250 lbs. PSI.

Four types of Unisorb have been developed to speed the installation and drastically cut the vibration of every machine in your plant.

This is how Unisorb works for you . . .

- **Saves up to 60% on installation time**
- **Cuts installation costs up to 30%**
- **Stops up to 85% transmitted vibration — increases machine life and operator efficiency**
- **Eliminates all bolts and leg screws, no drilling or patching. Easy to relocate machinery**
- **Sharply reduces noise**



Be sure you get just the right type, density and firmness for vibration-free anchoring — specify Unisorb. For over twenty years, production men have been using this mount to make their plants a better place to work and more profitable to run. Take advantage of this cost saving the next time you install or move a machine.

Send for Unisorb "Facts" Book

It will give you all the data on what kind of Unisorb to specify for a pay-off in your plant.

The name to remember is

UNISORB

the **FELTERS** company

209 SOUTH STREET, BOSTON 11, MASS.

Manufacturers of Felt and Felt products

Offices: New York, Philadelphia, Chicago, Detroit, St. Louis
Sales Representative: San Francisco
Mills: Johnson City, New York; Millbury, Mass.; Jackson, Mich.
Representatives in principal cities throughout the world

Unisorb eliminates vibration in this machine shop. Machinery is frequently moved, also effecting a big saving in maintenance costs.

FES-18

MACHINES WITH UNISORB

Please send me a copy of FACTS ABOUT ANCHORING YOUR MACHINES WITH UNISORB, at no obligation to me.

Name.....Title.....
(Please print)

Company.....

Address.....

City.....Zone.....State.....

R. H. Bohl, prominent painting contractor, states his case for spray painting

"The DeVilbiss spray method benefits everyone — contractors, painters, and customers alike — through better finishes, more jobs, and lower costs . . . "

"We were one of the first companies to use the spray method," relates Richard Bohl, president of the Bohl Painting Company, "and we've watched it grow into the necessity in the industry that it is today.

"You can understand its increasing popularity when you consider its advantages: 100% increase in coverage, lower cost, less scaffolding, less cleaning time needed. What's more, it enables painters to reach areas inaccessible to brush, and opens avenues of business never before available to contractors.

"Spray painting has proved the only answer for many big industrial jobs," he states. "Large buildings with high, vaulted, steel-beamed roofs were seldom painted before the advent of the spray gun. Because of the cost of multiple coats required of brush painting to cover accumulated dirt — plus clean-up time, and the prolonged interference with plant production — painting was beyond consideration.

"Spray painting is not confined to conventional jobs," Mr. Bohl adds. "Many new applications are turning up every day. For example, our recent application of a mastic coating on metal buildings not only served to protect and beautify the exteriors, but increased the insulating value 15%, as well.

"For the past fifteen years," says Mr. Bohl, "we have standardized on DeVilbiss equipment for all our spray jobs. Since equipment downtime can result in failure to meet contract dates, it's important to have good equipment . . . and good service. DeVilbiss spray tools give us unfailing dependability and uniform performance. And we get excellent service from DeVilbiss on parts and maintenance, too."

Improve your business now, by taking advantage of the benefits of the DeVilbiss spray method! Call your supplier for full information on DeVilbiss' complete line of spray guns, hose and connections, paint tanks, compressors, and accessories. Or write us direct.

Richard Bohl, president of the Bohl Painting Company, Columbus, Ohio, and veteran of 35 years in the painting business, has been using the DeVilbiss spray method for more than 15 years.

THE DEVILBISS COMPANY
Toledo 1, Ohio

Santa Clara, Calif. • *Barrie, Ontario*
London, England

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FOR BETTER SERVICE, BUY
DEVILBISS

FACTORY | CATALOG NEWS

To get these catalogs, circle item numbers on the Reader Service card next to back cover.

PLANT SERVICES

OTHER SECTIONS:
Buildings and Grounds ..... page B-30
Electrical Distribution ..... page C-32
(See also Part 1, page 120)

84—Fans. Bulletin 600-56 shows models for every requirement—fans, air blasters, roof ventilators, penthouse units, blowers, louvers and shutters, air circulators, and special purpose units. Accessories. Capacity tables. 12 pages. *Chelsea Fan and Blower Co.*

85—Blowers. This bulletin features the "Standardaire" blower, a compact axial flow positive displacement unit for handling gas or air under pressure or vacuum. Selection charts for low, medium, and high capacity applications for continuous duty. *Read Standard Corp.*

86—Valve. Circular No. V-123 contains details on a renewal seat ring gate valve that never has to be removed from the line to replace seat rings. Photos show simple seven-step method for replacing seat rings. Data on non-rising and rising stem models. *Fairbanks Co.*

87—Hose. Two useful bulletins. One covers general-purpose hose for air, acids, paint spraying, water, steam, etc. (16 pages, Form 3682). Another presents five basic multi-purpose hose that eliminate stocking many different types (8 pages, Form 3680). *Thermoid Co.*

88—Integral-Furnace Boiler. Bulletin G-38A features a unit that combines a boiler and water-cooled furnace; fired with pulverized coal, oil, or gas—alone or in any combination. Cutaway views, maintenance hints and drawings of arrangements are included. 20 pages. *Babcock & Wilcox Co.*

89—Power Sweeper. Maintenance men will be interested in this bulletin on the "3-Way Maintainer"—it sweeps, blows down, and picks up. Photos show it doing all these jobs, in both large areas and hard-to-reach places. Components illustrated. *Wilshire Power Sweeper Co.*

90—Air - Acetylene Appliances. Some of the products described in this 36-pager are gas tanks, leak detectors, torches, soldering irons, regulators and gages, furnaces, floodlights, hose and fittings, tank unions, needle valves; and many others. *Linde Air Products Co.*

91—Ventilators and Fans. Catalog No. 180 features portable ventilators, blower-exhausters, and man-cooling fans. Contains application photos, dimension drawings, and capacity tables. Information on hose for ventilators and exhausters. 20 pages. *Coppus Engineering Corp.*

92—Lighting. This booklet will tell you eight reasons why you'll get better lighting with mercury vapor lamps. Five models are illustrated. Inside view points up features. Color lighting discussed. Installation hints. 12 pages. *Sylvania Electric Products, Inc.*

93—Steel Shop Equipment. Some products in illustrated Catalog 100-E are cabinets, chests and safes, tool boxes, work benches, tool stands, shop boxes, shelving, tool storage equipment, lockers, revolving bins. 72 pages. Dimension drawings. *Lyon Metal Products, Inc.*

94—Storage Walls. Story on "Hallowell" units that are both storers and walls. Booklet shows them stacked high; butted end-to-end equipped with drawers of one of three different sizes; used without drawers, singly, or back-to-back. 8 pages. *Standard Pressed Steel Co.*

95—"Baby" Vent Sets. Bulletin FMB-135 describes uses for exhausting from hoods and vats where gases, odors, moisture, steam, etc., must be removed; blowing air into motors or generators; ventilating small areas. *Buffalo Forge Co.*

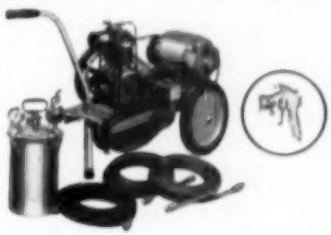
Turn the page

Paint without interrupting plant operations

Now, with a DeVilbiss Spray Outfit, any surface can be covered four times faster than by brushing. Your own maintenance men can do a complete paint job on a week end or at night — or while your plant is in operation — without interrupting production schedules! And with new, fast-drying materials, overspray is no problem.

Call your supplier today, or write for free Catalog M-51, listing complete line of DeVilbiss maintenance-painting equipment.

These DeVilbiss Spray Outfits will cut your painting costs!



One-man, 1-hp outfit — PL-604. Includes: portable compressor; 2-gal. paint tank; paint and air hose for 50-ft. reach; heavy-duty, large-capacity gun; hose and gun flusher; control and shut-off valves.

One-man outfit (without compresser) — P-QM-6061. Operates from your compressed-air line. Includes: 5-gal. paint tank; paint and air hose to reach 100 ft.; heavy-duty, large-capacity gun; hose and gun flusher; control and shut-off valves.

Spray gun and paint cup — P-JGA-502-58FX gun, P-KR-550 cup. For small painting jobs. Hooks into your compressed-air line with simple air hose. Actually costs less than some brushes!

THE DEVILBISS COMPANY
Toledo 1, Ohio

Santa Clara, Calif.
Barrie, Ontario
London, England

Branch Offices in Principal Cities

FOR BETTER SERVICE, BUY
DEVILBISS

Clean ...Motors and Generators... Quickly, Efficiently, Safely
with TURCO-SOLV
• Far More Efficient
than stoddard solvent
• Far Less Toxic
than carbon tetrachloride
• Far Safer
than gasoline
Also ideal for a host of other plant maintenance cleaning jobs
Since the introduction of Turco-Solv three years ago, hundreds of industrial concerns have purchased and used this material for electrical equipment and plant maintenance cleaning. A true detergent action safety solvent, only Turco-Solv offers you an unchallenged combination of user benefits... safety, efficiency, speed and versatility.
It is from a continuous program of laboratory research, testing and development that comes the constant improvement of existing Turco materials, and the certainty that Turco will develop new products, as they are needed, through the tomorrows that lie ahead.
TURCO
TURCO PRODUCTS, INC.
Chemical Processing Compounds
6135 So. Central Ave., Los Angeles 1, Calif.
Factories: Newark, Chicago, Houston, Los Angeles
Offices in All Principal Cities
Write for Booklet
"The Story of Safety Solvents"
FREE!
Valuable booklet discusses all methods of cleaning electrical equipment and gives advantages of each
FACTORY
HOW'S YOUR HEALTH?
Please Affix Coupon To Company Letterhead
TURCO PRODUCTS, INC.
6135 So. Central Ave., Los Angeles 1, Calif.
Please send me a copy of "The Story of Safety Solvents" without cost or obligation.
NAME
TITLE
F

FACTORY / CATALOG NEWS
Begins on page D-31

To get these catalogs, circle item numbers on the Reader Service card next to back cover.

96—Centrifugal Pumps. Two useful booklets: "Handy Guide to Selection of Centrifugal Pumps," lists maker's general-purpose and special-purpose pumps (8 pages). "Handbook for Care of Centrifugal Pumps," applies to all makes (16 pages). *Allis-Chalmers Mfg. Co.*

97—Power Sweepers. Folder offers two models, one that covers as much as 100,000 sq.ft. per hour. Construction features are illustrated with exploded and close-up views. Also vacuum attachment for cleaning shelves, bins, inaccessible areas. *Wayne Mfg. Co.*

98—Power Exhausters. Bulletin 53-B describes units for wall and roof applications. Features a low-contour roof model. Cutaway views show construction features. Hints on installing. Includes information on back draft eliminators. 6 pages. *Jenn-Air Products Co.*

99—Waste Intercepters. Bulletin 1W pictures equipment for intercepting grease, fats, oils, gasoline, paraffin, sediment, hair, sand and gravel, cotton and lint, plaster, precious metals. Cutaway views show how they work. Installation photos. *Josam Mfg. Co.*

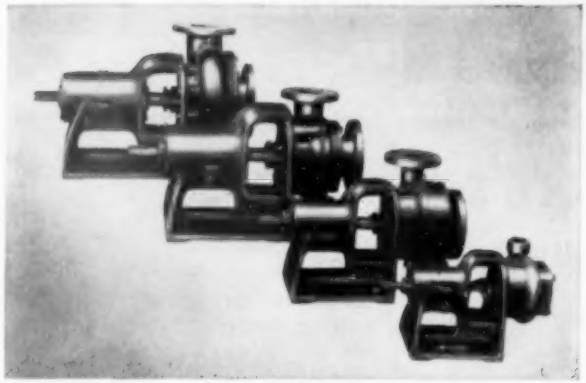
100—Heaters and Coolers. Product Bulletin 290 covers a complete line of heating, ventilating, air conditioning, and heat transfer equipment. Multi-room systems, unit air conditioners, cooling and heating coils, ventilating units are just a few. 36 pages. *Trane Co.*

101—Adjustable Steel Shelving. Bulletin shows how these open or closed units fit any stock change, change in floor plan, or need for more storage space. Shows ease of erection with "Ezy-Just" clips that position shelves in holes punched every 1½ in. *Frontier Mfg. Co.*

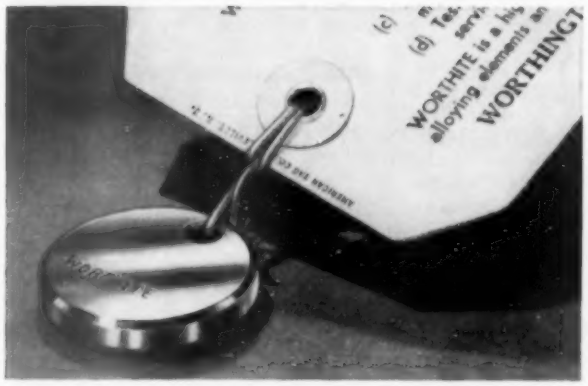
102—Television Systems. Closed circuit monochrome and color systems are described in two bulletins (ECL-29A and ECL-39A). Cam-

WHAT'S YOUR P.Q.*?

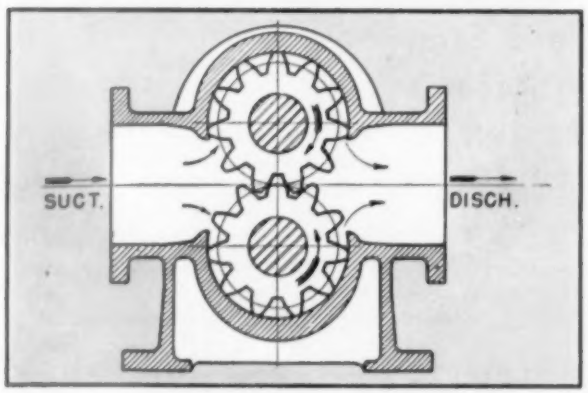
* Pump Quotient



Why are more and more end-suction pumps being specified? The answer's *simplification.* Industry is turning to end-suction pumps because they simplify piping (especially in process applications), need only one stuffing box, and make parts replacement easy. Get the full story on the Worthington end-suction pumps by writing to Section PC.4.8.



What is Worthite? Worthite is Worthington's "super-stainless", corrosion-resisting alloy steel containing more than 50% of the alloying elements: nickel, chromium, molybdenum, silicon, copper and manganese. The balance is mainly iron. Worthite was first introduced in 1936 and has gained wide acceptance as an excellent construction material for applications where corrosion is a problem. Worthington, of course, offers a complete line of Worthite pumps. Write for Bulletin W-350-B4.



Why are gear-type rotary pumps best for handling high-viscosity fluids? Lots of reasons. First, their large, unobstructed passages mean low entrance losses. Then, there aren't any valves or valve springs. Also, there's the flexibility in application offered by the wide speed range of gear-type rotaries. Write for Bulletin W-483-B2 for facts about the Worthington double-herringbone gear rotary pumps and vane pumps. PC.4.8

See your Worthington distributor for more information about end-suction pumps, Worthite and gear-type rotary pumps. But if you want to read up on these products before talking to him, write for our bulletins today. Worthington Corporation, Merchandising Division, Section PC.4.8, Harrison, New Jersey.

WORTHINGTON

BUY THESE WORTHINGTON STANDARD PRODUCTS FROM YOUR LOCAL DISTRIBUTOR

Air Compressors • Pumps • Multi-V-Drives • Allspeed Drives

How Did Wyman-Gordon Cut Out ALL Lost Production Time In Moving a Machine Shop?

←Here's the answer

The old-timers said it couldn't be done in less than five days — but Barry Leveling Mounts so speeded the reinstallation of lathes, millers, and grinders that the entire moving operation took only a two-day weekend. The vital test-preparation department was ready for work again on Monday morning. The machines set on Leveling Barry Mounts required no drilling of floors, no lagging, no shimming — they were just spotted according to plant layout, and quickly leveled. And because Barry Mounts isolate vibration, the machines do not walk, building-borne noise is reduced, and the accuracy of the precision machines in the Test-preparation Department is protected.

Ask Barry how YOU can cut machine-moving costs.

How Did Bullard Stop ALL Toolroom Rejects Due to Vibration?

With the Bullard Company's toolroom only 50 feet from a main-line railroad track, the vibration from passing trains often caused work spoilage or lost time as grinder operators waited for trains to pass. Moving the toolroom was out of the question. But the seven surface grinders were isolated from external vibration by a simple installation of Leveling Barry Mounts under each machine — at a cost of only $50 per machine. Rejects due to vibration were completely eliminated!

Ask Barry how YOU can protect precision machinery.

How Can YOU Gain These Advantages?

It's easy. Write for our plant survey booklet M-256 that tells you where to look for savings in your plant, then talk over your machine-mobility needs and vibration problems with a Barry representative or Barry Mount distributor.

BARRY CONTROLS
INCORPORATED
SALES REPRESENTATIVES IN ALL PRINCIPAL CITIES

BARRY B MOUNT
SOLD THROUGH INDUSTRIAL DISTRIBUTORS

736 PLEASANT STREET, WATERTOWN 72, MASSACHUSETTS

To get these catalogs, circle item numbers on the Reader Service card next to back cover.

eras, control monitors, and receivers are shown. Many useful applications are suggested. Features and specifications. *General Electric Co.*

103—Automatic Controls. Catalog 856 covers controls that incorporate sealed mercury contact switches for heating, refrigeration, air conditioning, etc. Points out features: silent operation; visible, never-wearing contacts needing no service. 52 pages. *Mercoid Corp.*

104—Pneumatic Tube Systems. Booklet contains information on carrier types and items carried; carrier dimensions and full-scale cross-sections; operation of the "Airtube" system; power units. Case histories of six typical users. Technical data. 50 pages. *Lamson Corp.*

105—Steam and Pump Cleaners. Two bulletins: One covers five models of stationary and portable steam cleaners (No. L-1301); points out inside and outside construction features. The other presents "Aquablast" high pressure washers (No. L-1106). *John Bean Div.*

106—Work Garments. Two leaflets offer to take care of your needs for coats, uniforms, and coveralls. Point out advantages of good appearance, morale, efficiency, health and safety to employees; economy for you. Shows available garments. *Linen Supply Assn. of America.*

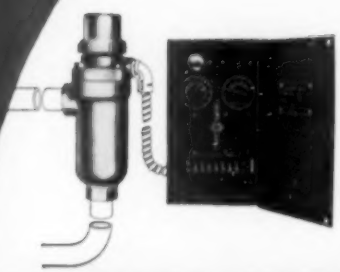
107—Lighting Specifications. Up-to-date RLM standard specifications —14 of them—covering 46 different types and sizes of industrial lighting units. Lists manufacturers who supply lighting units to these specifications. 46 pages. *RLM Standards Institute, Inc.*

108—Lighting Equipment. Bulletin LE illustrates many types of general lighting units, mercury vapor lamps, industrial fluorescents, commercial fluorescents, floodlights and fittings. Dimension data. 66 pages. *Benjamin Electric Mfg. Co.*

Turn to page D-40

keep liquid at its

BEST LEVEL



... by remote control with

ALCO 908 LECTRO-LEVEL

CUTS OPERATING COSTS! It automatically maintains the level you choose. Just set the dial! It may be used to ring an alarm, control a pump or operate any electrical device. For all non-corrosive liquids with specific gravity of 0.5 or more. Write for bulletin 908.

... or with **ALCO J-5** Float Switch

It holds liquid level to within a 1/8" differential ... "makes" the circuit when the level drops; "breaks" it when the level rises (reverse available). Only two major parts. For freon, methyl chloride, ammonia. Easy to install and service. Write for bulletins 175 and 175-1.

SEE YOUR ALCO WHOLESALER

Engineered—for Service for Life

ALCO

Designers and Manufacturers of Thermostatic Expansion Valves; Evaporator Pressure Regulators; Solenoid Valves; Float Valves; Float Switches.

ALCO VALVE CO.

833 KINGSLAND AVE. • ST. LOUIS 5, MO.

6317

Here's Mike

and his production brush

Everything that aids the manufacture of a product is *production* equipment. An increase in efficiency in any of this equipment adds profit to the business. Brushes are no exception. Whether used for painting, maintenance or as integral parts of machines, brushes play a vital role in today's industry. That's why the choice of a bristling material is an important decision. Mike's brush is an example. If it has bristles of "Tynex" nylon, it will perform better, last longer and, therefore, cost less in the long run!

"Tynex" bristles have been designed specifically to answer industry's needs. They possess a combination of properties unsurpassed by any other bristling material... excellent abrasion and heat resistance, low water absorption, long flex life and chemical and oil resistance.

That's why we recommend that you enlist the assistance of your brush supplier to help you with an analysis of your brush needs. If you are interested in the dollar-saving advantages of brushes bristled with Du Pont "Tynex," mail the coupon below. (If possible, please list specific brush problems.)

Specify brushes with TYNEX® nylon bristles

DU PONT
REG. U.S. PAT. OFF.

BETTER THINGS FOR BETTER LIVING ... *THROUGH CHEMISTRY*

If you are interested in the dollar-saving advantages of brushes bristled with "Tynex," mail this coupon today.

E. I. du Pont de Nemours & Co. (Inc.)
Polychemicals Department, Room 644, Wilmington 98, Delaware

I would like to learn more about the advantages of "Tynex" nylon bristles in brushes for industry. My specific brush problems are:

- *Name*_____
- *Title*_____
- *Firm*_____
- *Address*_____
- *City*_____ *State*_____

"Tynex" is the registered trademark for Du Pont nylon bristles.

Where air must be moved, to do the job—quietly,

TRANE Class III Fans—now in a wider range of *standard sizes*—are designed especially for industrial processing and drying . . . for high-pressure air conditioning systems. Rugged, dependable, efficient, TRANE Class III Fans make possible the use of smaller ducts, saving space and minimizing interference with craneways and other equipment.

TRANE Class III Fans come in a complete range of 15 *standard sizes* from 18 to 73 inches, for static pressures up to 11½ inches. Rated capacities to 310,000 cfm. Like all TRANE Fans, these fans are tested under the NAFM code.

there's a Trane Fan efficiently, economically!

One source, one responsibility for your fan requirements—including Class III Fans for high-pressure systems

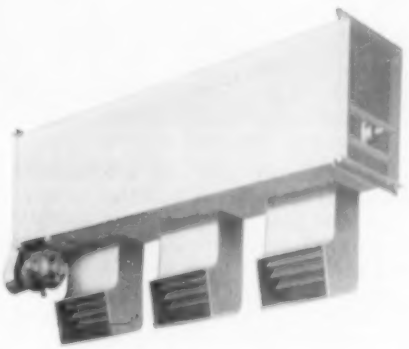
Now—select the fan or fans you need for that plant ventilating, air conditioning or process job—from the complete TRANE line for 1956! Each fan gives you maximum performance at low horsepower—at *low noise levels.*

TRANE Fans are versatile—doing more work in more places! That's because the TRANE Fan line is so complete—with a fan designed for almost any air handling job. You'll find TRANE Fans at work in industry providing smooth, effortless performance for all types of ventilating and air conditioning jobs . . . including high-pressure systems. TRANE Fans deliver full rated capacity—are tested under the NAFM code, carry the NAFM Certified Rating Seal.

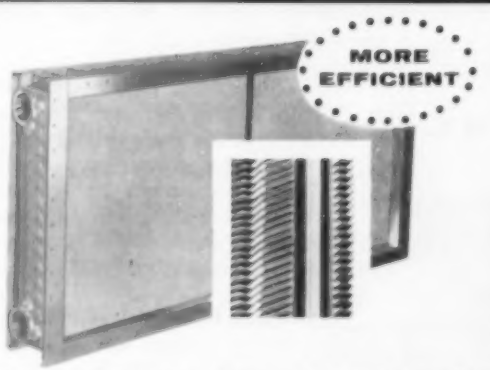
When you need a fan for drying, ventilating—for air moving, for plant process or comfort—see your nearby TRANE Sales Office or write TRANE, La Crosse, Wis.

TRANE Fan Bulletins *are the most comprehensive and helpful in the industry! Complete data, including rating tables and roughing-in dimensions. Write on your company letterhead for the Bulletin or Bulletins you need to help you select the right fan for any job: (1) FC fans, Class I and II. (2) BI fans, Class I and II. (3) BI fans, Class III. (4) Utility fans.*

TRANE Utility Fans. Package units for hundreds of plant ventilating jobs. Extremely quiet in operation. 37 FC and BI sizes. Rated capacities to 15,450 cfm.



TRANE Torridors heat as well as ventilate large areas, deliver a large volume of heated air long distances. TRANE Torridors may be installed with or without ductwork.



TRANE Coils for "built-up" systems have exclusive new Delta Flo Fin (inset) for increased heat transfer efficiency. *TRANE Steam Specialties* save fuel, stop waste, protect equipment. Complete line of valves, traps, vents, strainers for all kinds of heating or process applications.

For heating, cooling, ventilating . . .
For any air condition, turn to

TRANE

MANUFACTURING ENGINEERS

The TRANE Company, La Crosse, Wis. • Eastern Mfg. Div., Scranton, Pa.
TRANE Company of Canada, Ltd., Toronto • 90 U.S. and 19 Canadian Offices

Kill THE Rust

...then paint

OSPHO

CONQUEROR OF RUST

Saves Hours of Preparation Time—
Doubles Paint Job Life

OSPHO *stops* rust action. This metal treatment forms a perfect bond between rusted metal and your regular maintenance paint. The paint coat that follows OSPHO adheres so tightly moisture cannot penetrate to the metal. Your paint jobs last twice as long.

Save hours of preparation time—no sandblasting, no scraping, no flame-cleaning. Brush or spray OSPHO on over the rust. OSPHO changes it to hard gray iron phosphate. OSPHO is a carefully balanced formula of Orthophosphoric and Dichromate with extenders and wetting agents. So easy to use you don't even have to stir it. OSPHO is a *proven* product used—and reused—by hundreds of companies and institutions for their metal painting jobs. It's also an effective treatment for new metal before painting.

GOES SO FAR—COSTS SO LITTLE

A gallon covers a minimum of 500 square feet. Prices are:

Gallon Bottles (4 to a case)	**$3.00 per gal.**
10-gallon Kegs	**2.80 per gal.**
50-gallon Barrels	**2.60 per gal.**

(F. O. B. CLEVELAND)

KILL RUST WITH OSPHO—PLACE YOUR ORDER NOW

RUSTICIDE PRODUCTS COMPANY

3125 Perkins Avenue • Cleveland 14, Ohio

SEE FOR YOURSELF

1. Brush loose scale off rusted metal surface. Apply OSPHO. Let dry.
2. Test it. Scrape the surface. Note the chemical change that has taken place. OSPHO has stopped the rust, making a perfect base for paint.

QUALITY MAINTENANCE PRODUCTS SINCE 1917

FACTORY / CATALOG NEWS

Begins on page D-31

To get these catalogs, circle item numbers on the Reader Service card next to back cover.

109—Valves. Bulletin 561 contains descriptions, cross-section, cutaway views pointing out construction and operation details of bell and flanged-end non-rising stem gate valves; outside-screw-and-yoke gate valves. *Kennedy Valve Mfg. Co.*

110—Floor-Cleaning Equipment. Bulletin covers everything you need for floor care—scrubbing, waxing, polishing, and mopping equipment; waxes, sealers, and cleansers. Includes handy carry-all units and a water absorber for small congested areas. *Finnell System, Inc.*

111—Communication Systems. Catalog No. 255 describes and illustrates equipment that can be installed in four different types of systems to provide any service. Features new light annunciator models with chime call. Information on cable. 8 pages. *Rauland-Borg Corp.*

112—Batteries. Four bulletins on four types: High-tensile alloy grid, lead-calcium, and high-power batteries for control, switchgear, and auxiliary; batteries for alarms and signals. Shows "inside views" and construction details. Specs. *C & D Batteries, Inc.*

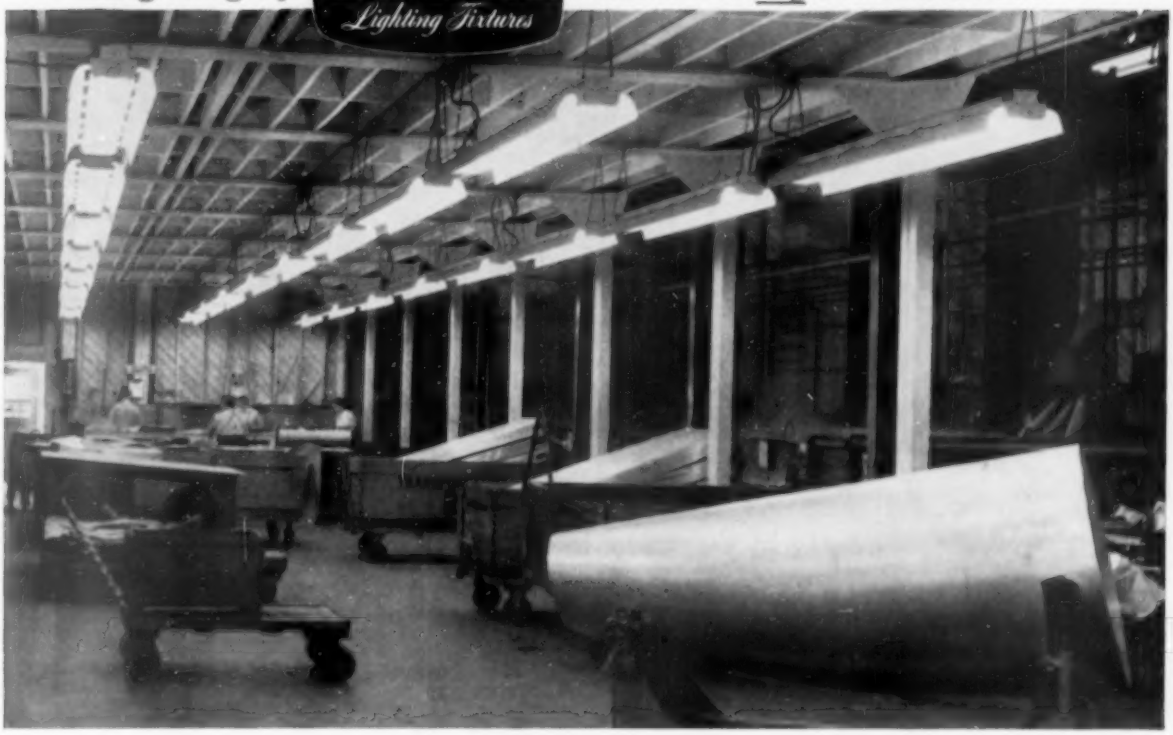
113—Rust-Preventive Coatings. 102 color chips in this catalog (No. 255) show available primers; restful color group finishes; machinery and implement colors; heat-, chemical-resistant, floor and deck coatings; oil-type coatings. 28 pages. *Rust-Oleum Corp.*

114—Steel Plate Exhausters. Bulletin SPE-102 describes and illustrates units for conveying, for dust, for high temperature, for fumes. Divided into sections on features, performance, and engineering. Shows various arrangements. 32 pages. *Chicago Blower Corp.*

115—Bulk Bins. Folder illustrates four-step procedure for assembling or disassembling with no bolts or screws, no tools, or special labor.

Turn the page

Lighting by "DECIDEDLY BETTER" DAY-BRITE Lighting Fixtures makes the big difference . . .



Day-Brite CFI-10 (*Comfort For Industry*) fixtures installed at Rohr Aircraft Corporation, Chula Vista, California.

Extra light . . . no extra cost
Day-Brite **CFI** industrial fixtures

By introducing slotted openings in the reflector tops of Day-Brite CFI (*Comfort For Industry*) fixtures, *a portion of the light is directed upwards.* This provides two advantages: (1) Longer periods of maintained illumination are assured because natural updraft ventilation keeps reflectors cleaner. This means extra light at no extra cost. (2) Harsh ceiling contrasts are washed out; eye fatigue and discomfort are reduced. Result: greater work accuracy, greater safety, less spoilage, improved production.

There are two types of Day-Brite CFI fixtures—the CFI-10 with a 10% upward lighting component; the CFI-25 with a 25% upward component.

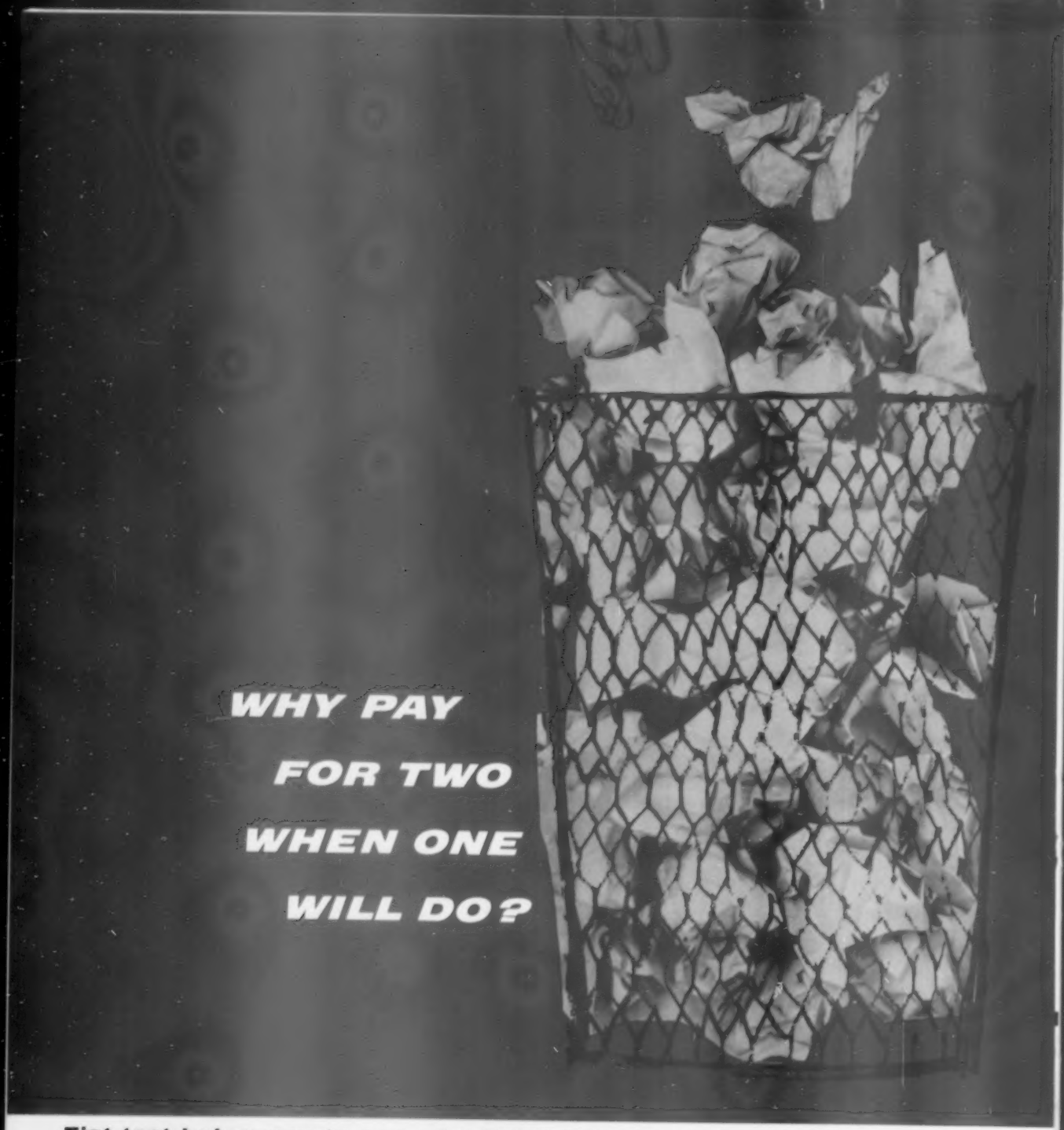
Before you decide on lighting or relighting, learn all the bonus advantages of this new industrial fixture. Call your Day-Brite representative. You'll find him in your classified phone directory. Or, send for CFI literature.

Day-Brite Lighting, Inc.
5441 Bulwer Ave.
St. Louis 7, Missouri

"DECIDEDLY BETTER" DAY-BRITE Lighting Fixtures

Nation's largest manufacturer of commercial and industrial lighting equipment

61121



Fist test helps you to see why Scott Towels cut towel consumption

Try this: Put your fist into a Scott Towel, see how it stretches and conforms to your hand—how the drying surface instantly comes into play. This makes for thorough drying. Result: one Scott Towel is used instead of two or more.

ONE SCOTT TOWEL DRIES BOTH HANDS!

It's this simple: If towel consumption is high in your washrooms, your towel costs are high. If consumption is low, your towel costs are down-to-earth. *Don't ever confuse initial price per case with economy.*

The Scott Towel has the qualities needed to keep consumption low—softness, stretch and high absorbency. One Scott Towel dries both hands quickly and comfortably. There's no extra consumption, no extra washroom maintenance—cost is at a minimum.

Scott's the brand of towel your people buy for home more often than any other brand.

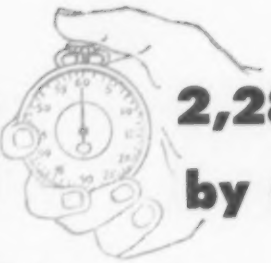
Give your local Scott representative or distributor a call today. Let him show you how you can determine the cost-reducing possibilities of Scott Towels in your washrooms.

Another quality product of

SCOTT PAPER COMPANY

Photo: Gjon Mili

Every minute handled 2,281,623 cu. ft. of air by CLARAGE in



New York's new Coliseum

. . . enough to fill a train of boxcars 5½ miles long

One of the biggest air handling assignments on record — and Clarage all the way!

For the Coliseum's colossal requirements, 75 Clarage Fans, 24 Unicoil Sprayed Coil Units, and 14 Multitherm Conditioning Units were selected. This choice, we feel, is an outstanding tribute to the worth of our equipment. Obviously, in a structure of this type, there could be no compromise with quality. Only the finest could qualify.

Make sure *your* investment in air handling and conditioning is a profitable one. Investigate the equipment we have perfected for every type of application.

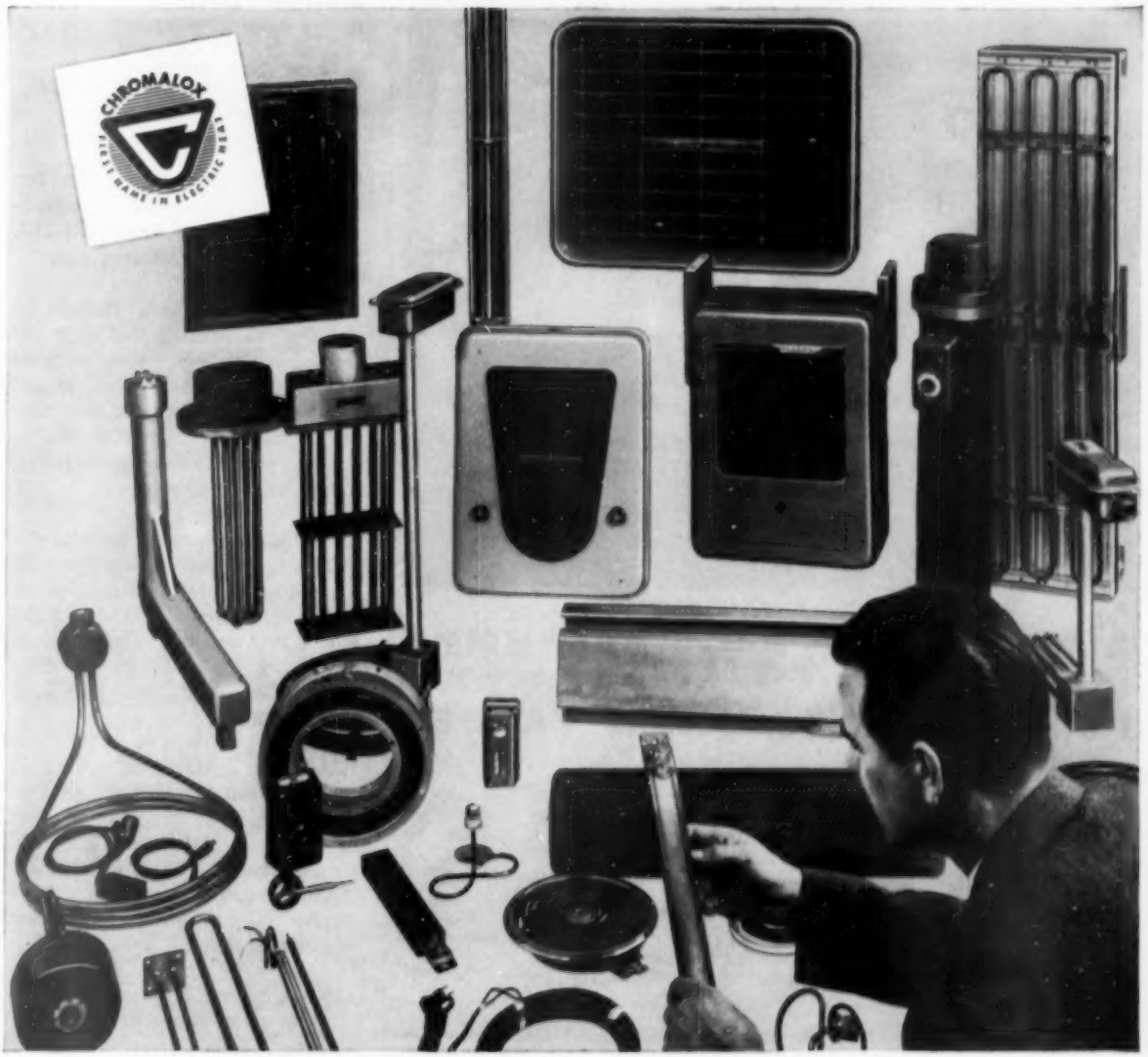
CLARAGE FAN CO., Kalamazoo, Michigan

OWNER — Triborough Bridge & Tunnel Authority
ARCHITECT — Leon and Lionel Levy
MECHANICAL ENGINEER — Guy B. Panero
STRUCTURAL ENGINEER — Dr. Jacob Feld
GENERAL CONTRACTOR — Walsh-Fuller-Slattery
HEATING, VENTILATING AND AIR CONDITIONING CONTRACTOR — Almirall & Co., Inc.

CLARAGE

. . . dependable equipment for making air your servant

SALES ENGINEERING OFFICES IN ALL PRINCIPAL CITIES • IN CANADA: Canada Fans, Ltd., 4285 Richelieu St., Montreal



Call the man with the ANSWERS!

Your Chromalox representative has the answer to your routine as well as unusual heating problems.

No matter where heat is needed, on the production line, in offices, warehouses, there is a Chromalox electric heating package especially designed for the job. Your Chromalox representative offers you prompt, competent counsel, on all heating problems.

His on-the-spot engineering assistance is backed up by thirty-nine years' experience and know-how in the design, manufacture and application of Chromalox electric heating units.

The Chromalox line, manufactured exclusively by Edwin L. Wiegand Company, is the world's most complete line of electric heating equipment. 15,000 standard types, sizes, and ratings . . . the world's largest stock . . . plus a complete range of controls and accessories.

Contact your Chromalox representative the next time you are faced with a heating problem or write direct for application information.

Edwin L. Wiegand Company • 7518 Thomas Boulevard, Pittsburgh 8, Pa.

Edwin L. Wiegand Company
7518 Thomas Boulevard, Pittsburgh 8, Pa.

Please send me the literature checked below:

- ☐ General Industrial Electric Heating Units
- ☐ Industrial Radiant Heaters
- ☐ 101 Ways to Apply Electric Heat
- ☐ How to Solve Winter Problems with Electric Heat
- ☐ Process Air Heaters
- ☐ Electric Heaters for Electroplating
- ☐ Thermwire Heating Cable
- ☐ Cartridge Heaters
- ☐ Circulation Heaters
- ☐ Strip Heaters
- ☐ Comfort Heaters
- ☐ Electric Range and Water Heater Units
- ☐ Baseboard Heaters
- ☐ Radiant Wall Panels
- ☐ Fan Driven Wall Insert Heaters
- ☐ Hi-Flow Portable Heaters
- ☐ Utility Spot Heaters

☐ Have a Field Engineer contact me.

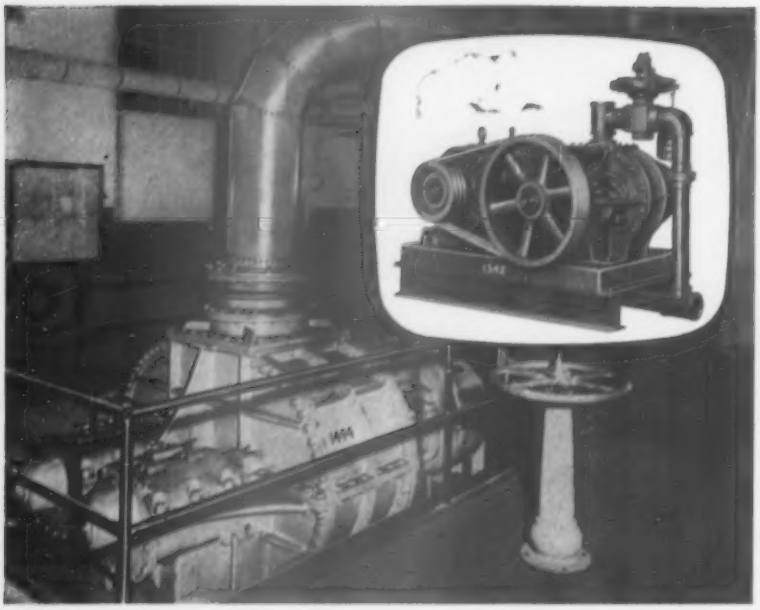
Name _____ Title _____

Company _____

Address _____

City _____ State _____

D-704



ALL SIZES OF R-C GAS PUMPS INCLUDE *plur-ability* VALUES

Positive control of volume and pressure, with the simple rotary impeller principle, stands out as one of the most valuable advantages of Roots-Connersville Gas Pumps. They deliver this prime essential, whether at a trickle of 5 cfm or an outpouring of 50,000 cfm.

This same simplicity of design, with sturdy construction, means little wear-out, down-time or maintenance. These *plur-ability* values mean that your R-C Pumps will probably outlive the equipment they serve.

With 76 sizes and capacities, R-C Rotary Positive units can be closely matched to your work. Or, if your plans call for Centrifugal Pumps or Exhausters, Roots-Connersville is the only builder offering you an unbiased *dual choice.*

Write for latest details and specifications in Bulletin 31-B-17 for small sizes and Bulletin 32-33-B-13 for larger units.

Ask about *plur-ability* in all R-C equipment

Centrifugal and Rotary Positive Blowers, Gas Pumps and Exhausters

•

Positive Displacement Vacuum Pumps and Meters

Inert Gas Generators

•

Spiroxial® Compressors

•

Detailed bulletins available on all R-C equipment.

ROOTS-CONNERSVILLE BLOWER

A DIVISION OF DRESSER INDUSTRIES, INC.

456 Central Ave., Connersville, Indiana. In Canada, 629 Adelaide St. W., Toronto, Ont.

FACTORY / CATALOG NEWS
Begins on page D-31

To get these catalogs, circle item numbers on the Reader Service card next to back cover.

Shows close-up views of the five components. Discusses 11 advantages. Product Sheet BB-114. *Sturdi-Bilt Steel Products, Inc.*

116—Hydraulic Tools. Bulletin 56 contains information on hydraulic jacks; center-hole, self-contained pullers; remote-controlled pumps and rams. Specifications and data on a wide range of applications in building and maintenance. 16 pages. *Templeton, Kenly & Co.*

117—Dust Collectors. Bulletin 49-DC features a dual cyclone type with travel from inlet to outlet to eliminate eddy currents. Shows two designs. Performance curves, photos of typical installations, specifications, information on supports. 8 pages. *Day Co.*

118—Floor Machines, Vacuum Cleaners. Bulletin lists six sizes of floor machines with brush diameters of 11-22 in. Discusses "balanced power" features. Offers wet and dry "Quiet Triple Power' and "Quiet Jumbo"; dry "Quiet Junior" and "Suction" vacuums. *Kent Co.*

119—Air Filter. Here's the story on "Roll-o-matic," an automatic filter with renewable filtering curtain of bonded glass fiber material, supplied in rolled form. Bulletin 248 discusses construction, operation, installation. Capacity tables. *American Air Filter Co.*

120—Ceiling Diffusers. Featured in Bulletin F-7722 are "Venturi-Flo" diffusers for high-ceiling applications requiring complete adjustability or long vertical projection. Diagrams of mounting methods. Shows photos of smoke tests. Performance data. *Barber-Colman Co.*

121—Paints. "Color Dynamics for Industry" discusses use of color to increase efficiency, improve plant maintenance, promote safety and morale. Shows methods of painting walls, ceilings, floors, equipment. *Pittsburgh Plate Glass Co.*

Turn the page

When modernizing or making plant additions

Janitrol Gas-Fired Unit Heaters

provide maximum flexibility

AT LOWER COST

In thousands of new and old plants, large and small, Janitrol Unit Heaters are making substantial dollar savings in operating costs year after year.

Hundreds of documented case histories show that original Janitrol installations can be as much as 50% less than the cost of a central heating system.

When it comes to proven longer-life dependability, remember only Janitrol can point to the amazing record of less than ¼ of 1% of more than a million heat exchanger tubes being replaced for any cause since 1940.

Other important features that lead to Janitrol's great preference with experienced heating men, architects and consulting engineers, include even heat distribution, quiet fan operation and a sales-service organization that's tops in the field.

Write today for book on Janitrol Unit Heater installations that cut service operation and maintenance to a minimum.

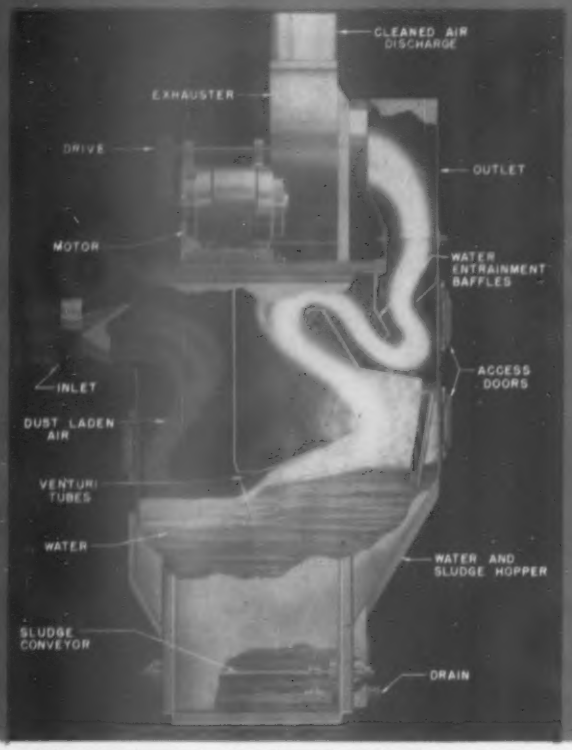
- NO FLOOR SPACE NEEDED
- EASY TO ADD UNITS AS NEEDED
- UNITS EASILY RELOCATED
- OPERATE WHERE AND WHEN NEEDED
- NO FUEL TO STORE OR ORDER
- NO FULL TIME OPERATING MEN

®Janitrol
GAS-FIRED UNIT HEATERS
For Natural, Manufactured and LP Gases

JANITROL DIVISION • SURFACE COMBUSTION CORP.
COLUMBUS 16, OHIO In Canada: Alvar Simpson Ltd., Toronto 13, Canada

ALSO MANUFACTURERS OF
Surface INDUSTRIAL FURNACES, *Kathabar* HUMIDITY CONDITIONING

NEW PANGBORN VENTRIJET
Gives Efficient Wet Dust Control



Efficient wet dust collection depends on breaking water into particles and mixing it with the dust. The new Pangborn VENTRIJET Collector utilizes venturi tubes to achieve this effect. As dust-laden air enters the inlet chamber, heavier dust particles sink to the bottom. The air stream then passes through the venturi tubes at high velocity, drawing water with it and breaking it into minute particles. These particles mix thoroughly with the remaining dust in the air and give the VENTRIJET its high operating efficiency. In the outlet chamber, the resulting sludge settles to the bottom for removal. Eliminator sections remove water droplets in the washed air and the cleaned air is then discharged. The result is peak performance in a minimum of space.

Pangborn VENTRIJET offers these advantages:

- Complete, self-contained unit with low headroom, minimum floor space
- High air velocity through venturi tubes insures thorough mixing of air and water
- Venturi tube design results in minimum pressure loss and provides uniform flow—no narrow channels to become choked with sludge
- Tube design and thorough washing action enable collector to handle heavy loads.

For full details, write to PANGBORN CORPORATION, 2100 Pangborn Blvd., Hagerstown, Maryland.

Visit "Pangborn Institute" at AFS Show, Atlantic City, May 3—9

Pangborn CONTROLS DUST

FACTORY / CATALOG NEWS

Begins on page D-31

To get these catalogs, circle item numbers on the Reader Service card next to back cover.

122—Air Diffusers. Bulletin No. 390-E-55 describes "Multi-Vent" modular diffusers for air conditioning, heating, and ventilating that deliver air straight down into room at comfortable, low velocity. Engineering data. *Pyle-National Co.*

123—Sound Barrier Curtains. Here's the story on "Bemisorb" transwall curtains for noise control. Bulletin shows how they may be used to deaden costly production noises, isolate annoying noise sources, or prevent flame spread. Photos. *Bemis Bro. Bag Co.*

124—Paints. "Engineered Color" outlines program for applying standard colors, using whites, to achieve color plans. Shows color chips of available decorative and heavy-duty finishes. Includes primers, finishes, varnishes. 16 pages. *Barreled Sunlight Paint Co.*

125—Valves and Fittings. Three offerings: Catalog 50V covers bronze and iron body valves (112 pages); Catalog SV2, cast steel valves (38 pages); Catalog 50F lists iron pipe fittings, screwed, drainage, and flanged patterns (117 pages). *Stockham Valves & Fittings.*

126—Air Heaters. "Thermobloc" gas- and oil-fired units are the subject of this 8-page booklet. Describes eight construction features—with the aid of a cutaway view of the unit. Shows five models and includes 13 installation photos. *Prat-Daniel Corp.*

127—Fluorescent Fixtures. This 118-page catalog is divided into tabbed sections on area illumination, commercial units, recessed lighting, industrial units. Useful information on lighting characteristics, mounting, maintenance, applications. *Smithcraft Lighting Div.*

128—Engineering and Construction Service. "25 Years of Qualtty Construction" tells about this company's latest building job for the

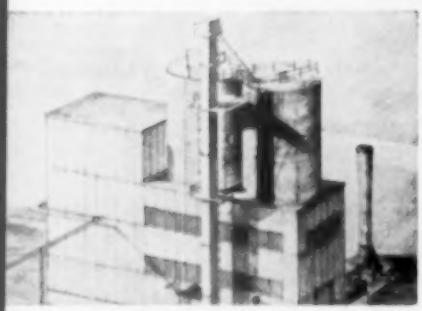
Turn to page D-50

DUPONT'S Barksdale, Wis. Works saves $7,000 a year with new automatic combustion controls.

HUDSON MOTORS' modernized plant in Detroit saves $480,000 a year—cuts powerhouse labor 27%.

SYRACUSE UNIVERSITY, N. Y., built a completely new unit for maximum economy and dependability.

For efficiency... for economy...



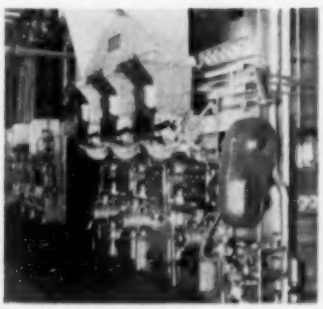
AT STAUFFER CHEMICAL'S new plant in Louisville, Ky., total cost of steam is only 60¢ per 1,000 lbs.

Coal costs 29.6% less than next cheapest fuel at ADDRESSOGRAPH-MULTIGRAPH'S plant in Cleveland.

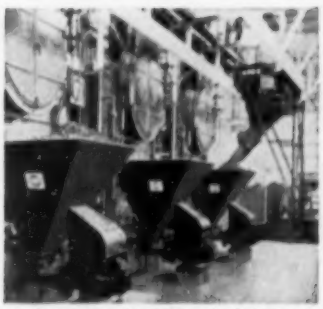
MOTOR PRODUCTS CORP. of Detroit, Michigan, saves $54,000 a year with modernized installation.

more and more firms

Burning coal the modern way saves PENNSYLVANIA RAILROAD'S, Ft. Wayne, Ind. terminal $33,000 a year.



Efficient new equipment reduces labor and improves performance records for LIGGETT & MYERS at Richmond, Va.



At LAKEWOOD HOSPITAL, in Lakewood, Ohio, new automatic coal burning facilities cut fuel costs 22%.

UPJOHN'S new Kalamazoo, Mich. plant is clean and efficient with no dust or smoke nuisances.

are burning coal the modern way

Chicago's ultra-modern PRUDENTIAL BUILDING has fully automatic coal handling and burning system.

GOODYEAR saves $3,000 a day with new coal-burning installation at Akron, Ohio.

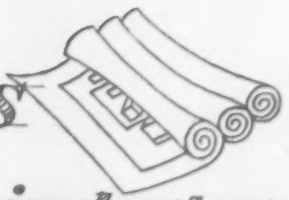
facts you should know about coal

- In most industrial areas, bituminous coal is the lowest-cost fuel available.
- Up-to-date coal burning equipment can give you 10% to 40% more steam per dollar.
- Automatic coal and ash handling systems can cut your labor cost to a minimum.
- Coal is the safest fuel to store and use. No dust or smoke problems when coal is burned with modern equipment.
- Between America's vast coal reserves and mechanized coal production methods, you can count on coal being plentiful and its price remaining stable.

For further information or additional case histories showing how other plants have saved money burning coal, write to the address below.

NATIONAL COAL ASSOCIATION
Southern Building, Washington 5, D. C.

HOFFMAN'S ENGINEERED SYSTEMS designed to do the tough jobs in industry



FOR DRY MATERIAL CONVEYING SYSTEMS— COUNT ON SPECIALIZED ASSISTANCE FROM HOFFMAN

One example of equipment designed and built by Hoffman for a specialized purpose. Hoffman engineers demonstrate how materials are conveyed by a 5 h.p. Hoffman portable vacuum unit with a high efficiency cyclone giving practically 100% separation.

Fast effective coverage of every area and surface in your plant for *complete* pick-up of coal, sand, ash and any dry material—and immediate transfer to a central recovery point for salvage or disposal — all these are your advantages with Hoffman Vacuum Cleaning Equipment.

High-powered suction is piped throughout the plant with convenient inlet valves for attaching hose and pick-up nozzles. Dust separators that thoroughly clean the conveying air are located wherever the collected material can be most easily handled. Only clean air passes through the multistage centrifugal vacuum producer which Hoffman designs and builds to operate for years with minimum wear and maintenance.

HOFFMAN portable vacuum cleaners are also available in 1½ to 7½ HP capacities.

See how effectively HOFFMAN Equipment can improve clean-up and production requirements in your plant. Talk it over with a HOFFMAN Engineer.

Please write:

U.S. HOFFMAN MACHINERY CORP.
AIR APPLIANCE DIVISION
DEPT. F.M.M., 103 FOURTH AVENUE, NEW YORK 3, N. Y.

AIR APPLIANCE DIVISION

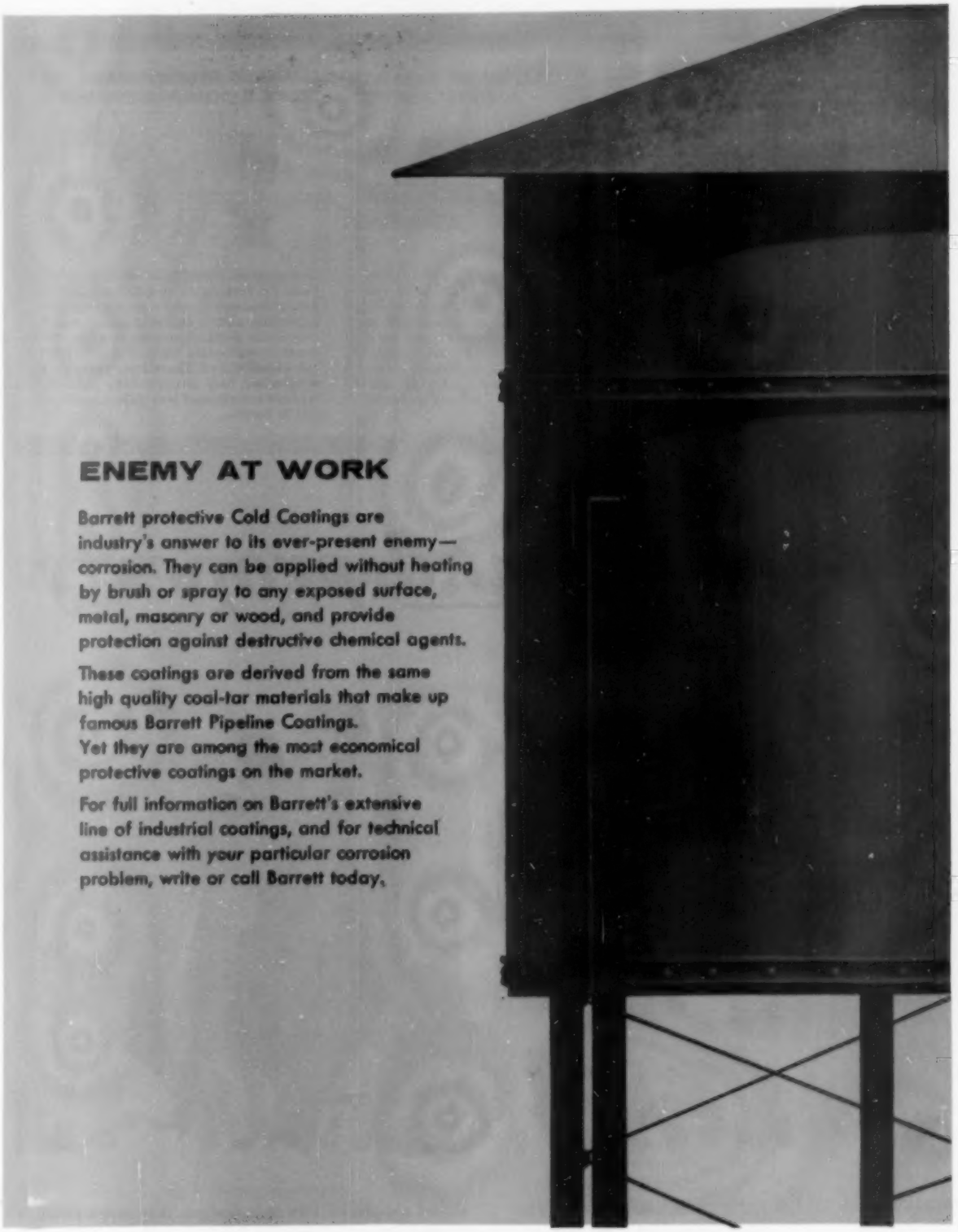
Multistage Centrifugal Blowers and Exhausters
Pneumatic Conveying Equipment
Industrial Vacuum Cleaning— Portable and Stationary Systems
Continuous Metal Strip Driers
"Smoothflow" Fittings and Tubing

INDUSTRIAL FILTRATION DIVISION

Machine Tool Coolant Clarifiers— Flotation, Mechanical, and Magnetic.
Lubricating and Insulating Oil Conditioners, Filters, and Vaporizers
Solvent Recovery Systems— Vacuum Stills and Filters

ORDNANCE EQUIPMENT DIVISION

Special Pneumatic Conveying Systems
High Efficiency Centrifugal Separators
Stationary and Portable Vacuum Cleaning Equipment
Process Equipment
Pneumatic Systems for Radioactive Materials



ENEMY AT WORK

Barrett protective Cold Coatings are industry's answer to its ever-present enemy—corrosion. They can be applied without heating by brush or spray to any exposed surface, metal, masonry or wood, and provide protection against destructive chemical agents.

These coatings are derived from the same high quality coal-tar materials that make up famous Barrett Pipeline Coatings. Yet they are among the most economical protective coatings on the market.

For full information on Barrett's extensive line of industrial coatings, and for technical assistance with your particular corrosion problem, write or call Barrett today.

CHEMICAL PROGRESS WEEK-APRIL 23-28

Barrett®

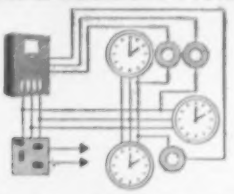
INDUSTRIAL COATINGS

BARRETT DIVISION, Allied Chemical & Dye Corporation, 40 Rector Street, New York 6, N. Y. In Canada: The Barrett Company, Ltd., 5551 St. Hubert Street, Montreal, Que.

OVER 100 YEARS OF EXPERIENCE

with EDWARDS
industrial scheduling,
protection
and control systems . . .

EDWARDS SYNCHROMATIC CLOCK & SCHEDULE SYSTEMS



The simplest centrally controlled system. Perfection of the Telechron® motor obsoletes hourly correction or a master clock . . . provides simultaneous reset instantly after power failure, automatically or by the flick of a switch. Edwards Program Control is ruggedly constructed, easy to set . . . no paper tape, no complicated bars to break, adjust or remove.

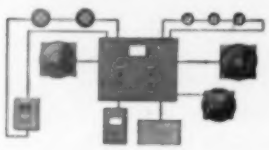
personnel and property

Especially with today's rising costs, you'll want to provide for the virtually maintenance free operation and long service life assured with Edwards quality signaling equipment for every plant need.

From the smallest bell to the most complete stystem, every Edwards product has been developed through more than three quarters of a century's specialization in electric signaling devices. This experience has produced simplified Edwards designs that make possible unqualified guarantees of perfection in materials and workmanship.

Edwards equipment is first choice with Electrical Contractors. They know: "It pays to specify the best . . . make sure it's Edwards". Ask *your* electrical contractor, your architect, or write: Edwards Company, Inc., Norwalk, Conn. (In Canada: Owen Sound, Ont.)

EDWARDS INDUSTRIAL FIRE ALARM SYSTEMS



Newest of Edwards many UL approved systems has both manual and automatic alarm stations to assure complete 24 hour fire protection. During power interruptions system is automatically switched to batteries. Can be connected to sprinkler system and (or) to municipal fire headquarters. Low voltage operation assures low cost installation.

EDWARDS INDUSTRIAL CONTROL SYSTEMS

Edwards offers all types of Annunciators to indicate high temperature, machinery failure, water level, pressure drop, flow indication, current failure or other process control. Standard annunciator systems are designed to operate on the simplest or most complicated circuits. They are available in lamp or drop-type indications.

EDWARDS SIGNAL DEVICES

Edwards complete line of bells, horns, and buzzers give the correct tone and intensity to overcome all noise conditions. The "Adaptabel", typical of Edwards specialization, has no contacts or armatures, maintains original tone and intensity for a lifetime.

are in good hands!

EDWARDS

Specialists in Signaling since 1872 **DESIGN • DEVELOPMENT • MANUFACTURE**

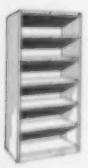
penco—There's Economy in The **RIGHT** Equipment

His briefcase "carries" a
FAMOUS FACTORY

When a Penco dealer calls on you, he knows that he can supply you with *more* than the equipment you need in steel shelving, cabinets and lockers.

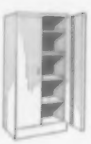
Prompt delivery, for instance, because Penco—a division of Alan Wood Steel Company—has an assured supply of quality steel. The Penco dealer represents a firm which has pioneered in sheet metal products since 1879 . . . knows the problems of space and economy facing its customers . . . and has developed units of sturdy construction and *standard* component parts which give you low-cost equipment "custom-tailored" to your needs by the experienced Penco Planning Service, available without charge.

Write for Catalog FM.



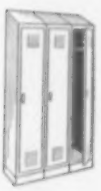
penco
Steel Shelving

puts efficiency at your workers' fingertips. Its variety of standard sizes and interchangeable units makes possible a flexibility of arrangement that will exactly meet your needs.



penco
Steel Cabinets

the Quality line—offers a complete range of sizes . . . all with adjustable shelves . . . in storage, wardrobe, combination, counter-high, desk-high, and tool cabinets.



penco
Steel Lockers

the Perma-Built Line—enable your dealer to offer you more than 60 types and sizes. You'll find a design that fits your space needs and gives satisfaction to your workers.

Planning for Your Service—Swift Service for Your Plans

Penco specialists in storage equipment engineering are available—at no cost to you—to assist in planning an efficient, practical shelving installation to meet your needs.

As a division of Alan Wood Steel Co., steelmasters for 130 years—Penco is assured the full supply of high-quality steel which enables it to make prompt delivery on all orders.

penco
STEEL LOCKERS
CABINETS · SHELVING

penco METAL PRODUCTS DIVISION
ALAN WOOD STEEL COMPANY
Oregon Ave. & Swanson St. • Philadelphia 48, Penna.

FACTORY / CATALOG NEWS
Begins on page D-31

To get these catalogs, circle item numbers on the Reader Service card next to back cover.

Atomic Energy Commission and other jobs it has completed. Shows men at work. Cites some awards received. *F. H. McGraw & Co.*

129—Maintenance - Free Pumps. Here are the details on single-stage pumps for general hydraulic service that require no stuffing box attention, no bearing lubrication. Cross-section and exploded view of parts shows simple construction. 16 pages. *Ingersoll-Rand.*

130—Fire Extinguishers. Dry chemical equipment is featured in this 20-pager—hand, wheeled, low temperature, stationary extinguishers; piped systems; mobile equipment; extinguishers for magnesium, other metals. Tells how to use and recharge. *Ansul Chemical Co.*

131—Unit Heaters. Catalog 155 presents horizontal, power-throw, and vertical types for steam and hot water. Information on selection, sound ratings, locating, motor wiring and control, piping and installation, typical specifications. 30 pages. *Modine Mfg. Co.*

132—Valves. Circular No. 603 describes solder-end bronze valves. Offers globe, gate, and check models. Recommends for steam, hot and cold water lines; heating and air-conditioning systems; gas lines; underground water lines. Cross-sections. *Lunkenheimer Co.*

133—Cooling Fans. Subject of this bulletin is precision-engineered air delivery (using "Aeromaster" fans)—tells what it is, where it came from, what it can do for you, how you can make use of it, what it has done for others. Installation photos. *Koppers Co.*

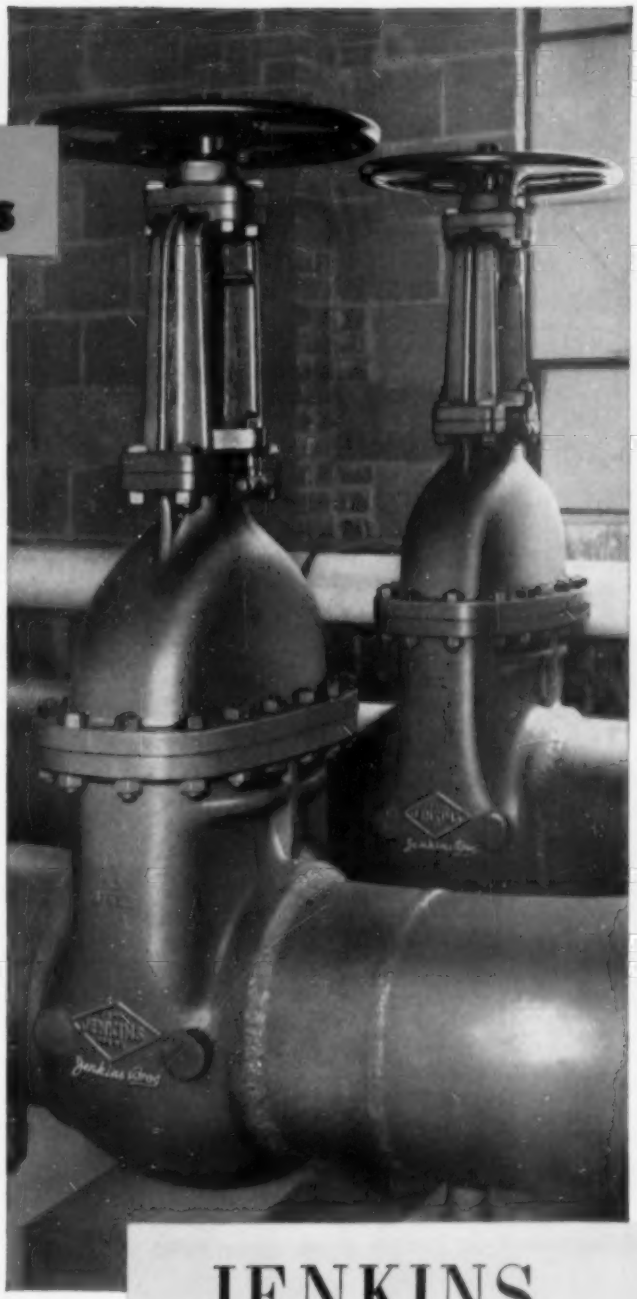
134—Centralized Lubrication. Bulletin No. 26-R describes operation of the "Dualine" measuring valve; pumps, valves, and spray valves that go into centralized systems. Shows applications in 16 industries. 20 pages. *Farval Corp.*

Turn the page

For higher pressures
— higher temperatures

JENKINS CAST STEEL VALVES

serve the systems planned for lowest operating costs



The steadily increasing number of power generation and industrial processing installations of Jenkins Cast Steel Valves is clear evidence of economy-minded selection by valve specifiers and buyers.

Jenkins Cast Steel Valves offer any required combination of casting alloys and seating metals for any service up to 600 lbs. pressure and 1000°F. temperature. Along with specified ratings, buyers get the plus of Jenkins *extra value*, in design, in construction, in quality standards.

Test Jenkins Cast Steel Valves at the most punishing control points in your plant. Compare performance, and you'll see how they set new standards for long-range economy.

PATTERNS

Gates 2" to 24". Globes and Angles 2" to 10". Swing Checks 2" to 12". Non-return, stop and check Globes and Angles 4" to 10".
Screwed, Flanged, or Weld Ends.

PRESSURES

150 lb. — 300 lb. — 400 lb. — 600 lb.

PRESSURE CASTING ALLOYS

Carbon Steel (150 lb.)
Carbon Molybdenum Steel — 300, 400, 600 lb. Valves
Chromium Molybdenum Steel

SEATING METALS

H Monel
13% Chromium Stainless Steel
Carbon Molybdenum Steel, Stellite faced
AISI Type 316 Stainless Steel

JENKINS
LOOK FOR THE JENKINS DIAMOND
VALVES
SINCE 1864 TRADE JENKINS MARK
Jenkins Bros

FOR COMPLETE SPECIFICATIONS, GET THIS CAST STEEL VALVE CATALOG

It describes all patterns, casting alloys, and seating combinations, with details of the extra value design and construction features. Gives pressure-temperature ratings, dimensions, and other technical data. Get a copy from your Jenkins Valve Distributor, or write, Jenkins Bros., 100 Park Ave., New York 17.

SOLD THROUGH PLUMBING-HEATING AND INDUSTRIAL DISTRIBUTORS

Use Aluminum Paint to reduce maintenance cost!

Aluminum Paint actually puts a *protective shield* on rustable metal and masonry surfaces. Usually one coat is all that's needed. And it lasts and lasts and lasts!

Aluminum Paint Protects against corrosion from fumes and smoke; seals against moisture and rust; reflects light and heat (makes everything brighter); reduces evaporation of volatiles; holds heat expansion to a minimum.

Reynolds Metals Company does not make aluminum paint. But if you would like the names of manufacturers who rely on the high quality of Reynolds Aluminum Pigments, we'll gladly send you the list. Just use the coupon below.

Aluminum Roof Paints and Coatings Add Years to Roof Life

Asphalt-Aluminum roof paints and coatings provide low-cost, long-life protection for built-up and rustable metal roofs. Also reflect sun's heat to keep buildings up to 15° cooler in summer. Ask the paint salesman to show you his heat reflection demonstration. Insist on Asphalt-Aluminum roof paint or coating with this Warranty Seal. It assures you of an approved vehicle and at least two full pounds of pure aluminum pigment in every gallon.

See "FRONTIER," Reynolds exciting dramatic series, Sundays, NBC-TV.

Reynolds Metals Company
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Please send me information about:
- ☐ Aluminum Paints.
- ☐ Roof Coatings.
- ☐ Also send list of aluminum paint manufacturers.
- ☐ Also send list of asphalt-aluminum roof paint and coating manufacturers.

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The Finest Paints Made with Aluminum are made with REYNOLDS ALUMINUM PIGMENT

To get these catalogs, circle item numbers on the Reader Service card next to back cover.

135—Central Control Systems. 20-page booklet describes systems for automatic control of on-off functions via carrier current—without special control wiring. Shows use for control of lights, heating and ventilating, clocks, etc. *International Business Machines Corp.*

136—Oil-Free Compressors. Bulletin A-44 recommends them for instrument control, food processing, pharmaceuticals, electronic equipment manufacture, chemical processing, pressure-testing food containers. Shows components, cross-section view. 8 pages. *Joy Mfg. Co.*

137—Portable Fire Extinguishers. "Fyre-Freez" carbon dioxide units are the feature of this folder. Five models for handling 2½ to 20 lb. of CO_2 are shown. Discusses operating and servicing; features. Includes "a word about cylinders." *Walter Kidde & Co.*

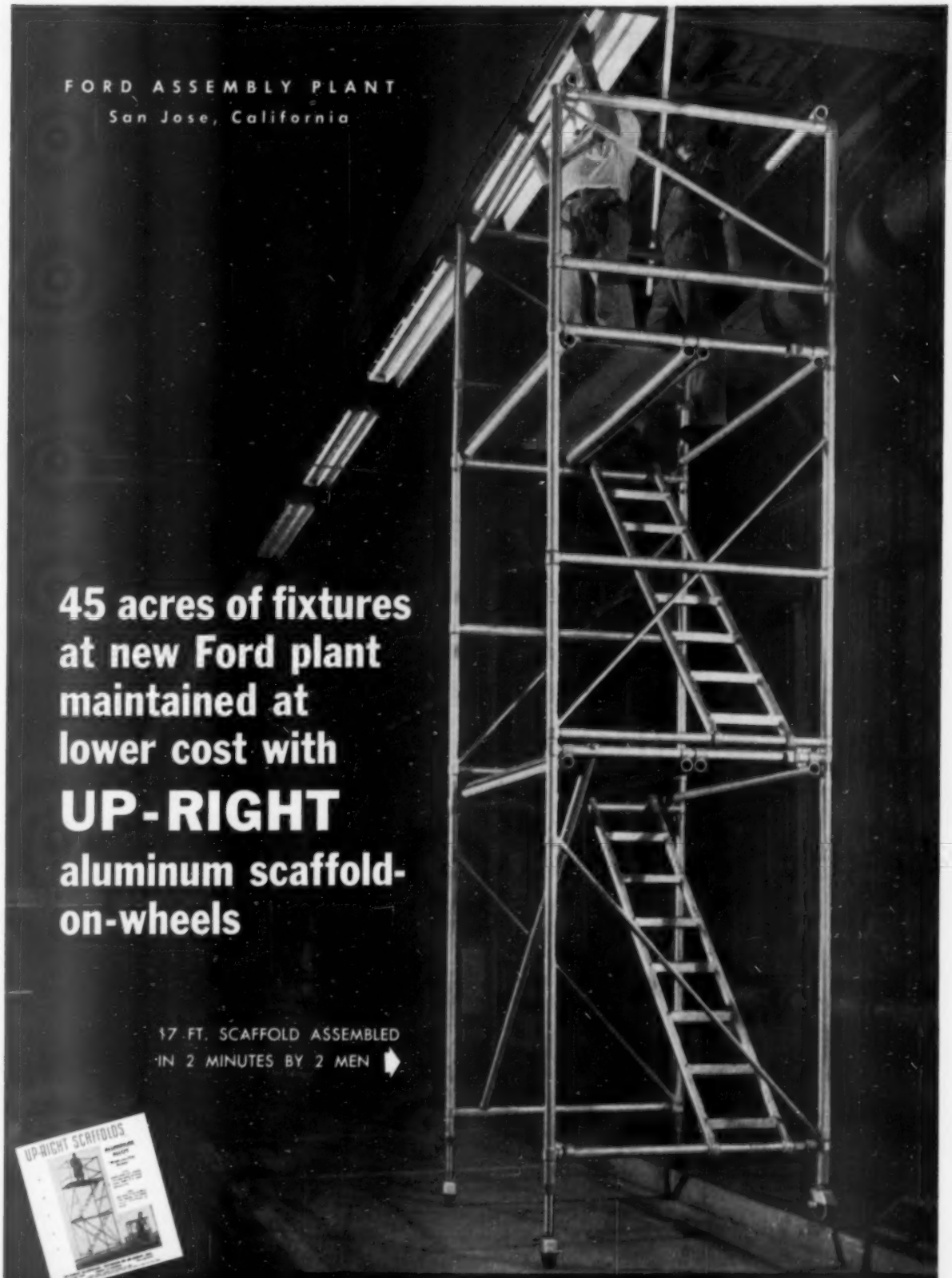
138—Spray Equipment. Among the products illustrated in Catalog M-51 are air-dusting guns, paint-spray guns (including a new economy model), hose, cups, material containers, and outfits. Also shows adapters, pumps, couplings, etc. 28 pages. *DeVilbiss Co.*

139—Soot Blower Packing. Folder recommends "Cumpac" style No. 236 for high pressures and temperatures. Exterior and cutaway views help illustrate special heat-resistant construction, high sealing efficiency. Six other packings are briefly described. *Johns-Manville.*

140—Water Softeners. Bulletin MSP-123 contains cutaway drawings, illustrating their construction; indicating simple connections by which they're fitted into a water system. Capacities of various models are given, together with pertinent specifications. *Hagan Corp.*

141—Shop Equipment. Equiptogram No. 481 shows many types of steel shelving, bins, drawer units, storage units, and lockers. Includes

FORD ASSEMBLY PLANT
San Jose, California



45 acres of fixtures at new Ford plant maintained at lower cost with

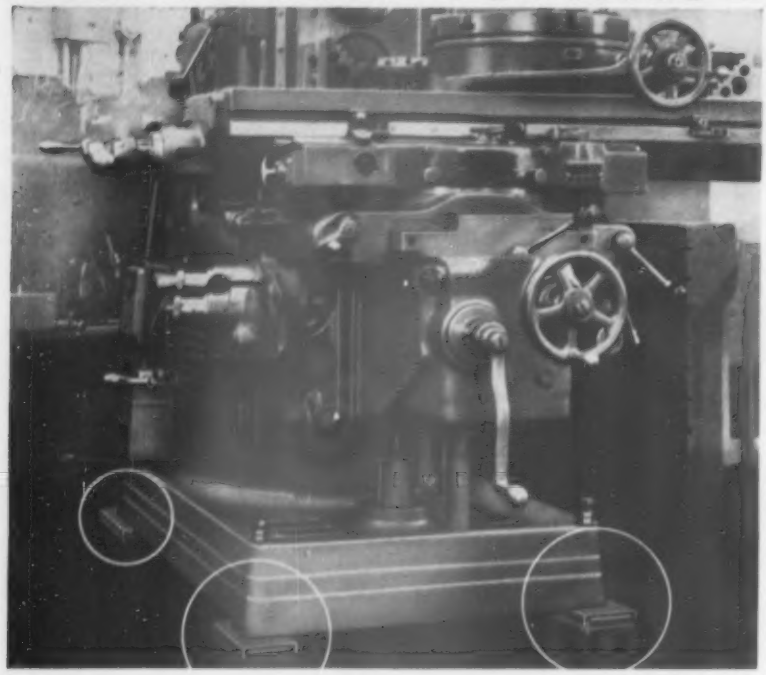
UP-RIGHT

aluminum scaffold-on-wheels

17 FT. SCAFFOLD ASSEMBLED IN 2 MINUTES BY 2 MEN

You, too, can save with these rapidly assembled Up-Right aluminum scaffolds.
Write for circular • Up-Right Scaffolds • Dept. 161 • 1013 Pardee St., Berkeley, Calif.

KORFUND
VIBRATION CONTROL



lets you INSTALL MACHINERY in MINUTES

Machinery installation need not be the tedious, time-consuming (and therefore costly) job it once was. Korfund units let you install machinery in minutes.

For example, machine tools like this precision miller need not be bolted to the floor because the LEV-ELASTO Dampers used prevent "walking". Leveling, with the built-in leveling screws requires only a wrench and a few minutes time—eliminating shims and saving both time and temper. And, as an added plus, the Dampers protect the machine from transmitted vibration that can cause rejects.

Of course, all our installations are not as simple as this—in some cases, tremendous weights are involved, or vibration problems are critical, or both. In these cases, plant engineers are enthusiastic about Korfund Steel Spring Vibro-Isolators.

Solving vibration control and machinery mounting problems is Korfund's specialty. We have more than a half-century of experience in the field. Our experience lets us recommend "the right way the first time"—no trial-and-error basis is necessary.

Write for your copy of the Korfund Plant Engineers' Guide—you'll find it full of helpful information. Ask for Bulletin 33.

For specific recommendations contact us or one of the 46 local Korfund offices. Look under "Korfund" in your local Telephone Directory or in Thomas' Register.

THE KORFUND CO., INC.

KORFUND VIBRATION CONTROL — SPRINGS — RUBBER — CORK

48-35C Thirty Second Place, Long Island City 1, N. Y.
In Canada: 510 Canal Bank, Ville St. Pierre, Montreal

FACTORY / CATALOG NEWS
Begins on page D-31

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toolroom storage, equipment, trucks, counters, mail room equipment, benches, tool toters, stands, handy units. 32 pages. *Equipto.*

142—Dust Collectors. Catalog 72-B (36 pages) discusses "Dustube" engineering and advantages. Shows knocked-down, assembled, and automatic models, plus auxiliary equipment. Companion booklet (24 pages) of case histories. *American Wheelabrator & Equipment Corp.*

143—Lighting. This booklet contains "25 industrial lighting solutions." Some of the installations pictured are in an assembly and inspection area, cafeteria, explosion-proof area, food processing and packaging plant, washroom; many others. *General Electric Co.*

144—Tape. Brochure of 8 pages offers many types and colors of pressure-sensitive tapes for plant maintenance. Contains photos of 25 applications in lane marking, paint masking, plant safety, duct sealing, and miscellaneous plant uses. *Minnesota Mining & Mfg. Co.*

145—Enamels. Folder offers colors for safety code identification, pipeline identification, machine tools, trim and equipment. Tells how and where they should be used. Lists recommended surfaces, interior and exterior. Application directions. Color chips. *Arco Co.*

146—Electric Heating Units. Catalog 50 describes a type and size for every need—"Chromalox" immersion, circulation, radiant, forced air duct, and unit heaters. Shows elements that go into them. Includes thermostats, related equipment. 50 pages. *Edwin L. Wiegand Co.*

147—Generator Sets. Standby power units in the 50- to 350-kw. class are the subject of this 8-pager. Includes cooling accessories—fuel systems; cooling system; starting, speed control, safety devices. In-use photos. *Le Roi Co.*

Turn to page D-60

Hall Industrial Water Report

VOLUME 4 APRIL 1956 NUMBER 2

Corrosion—a Plague on All Our Houses

—presents problems as varied as industry, for all industry uses water in some way and all water causes corrosion to some extent. Thirty years of experience in thousands of individual plants enables Hall Laboratories to apply to current problems the most practical techniques for control of corrosion, many of them developed by Hall research and engineering.

Condensate System Saved

On his first visit to a new client, a hospital in Virginia, Hall engineer C. F. Raines encountered corrosion of the black iron condensate system so "terrible" that two men were kept constantly busy just replacing fittings and piping.

Both pitting and etching of the steel were occurring, suggesting that both dissolved oxygen and carbon dioxide were factors in the corrosion. However, the oxygen was not readily accounted for.

Raines examined the feedwater heater and found there was no way for the steam from the deaerating section to pass to the vent condenser. A tee had been installed in the line to take care of this, but instead had been used for a condensate line from the laundry. By proper rearrangement of connections, adequate venting was obtained as had originally been intended.

Additional changes included feeding 1 ppm. of Hagafilm® to the boilers to inhibit return line corrosion, and Santosite to react with residual oxygen not removed in the feedwater heater. Condensate line corrosion became negligible. Instead of replacing the entire condensate system at a cost of several thousand dollars, the plant now protects the system chemically at a cost of 17 cents a day.

Gasket "Corrosion" Problem Quickly Solved

Attack of boiler handhole gaskets at the pressure points of the locking clamps—center top and center bottom—on the sealing surfaces was experienced at a plant in West Virginia serviced by Hall engineer Wm. J. Reese.

At first it was thought that a highly-concentrated solution of caustic had dissolved the asbestos packing.

This possibility was rejected when it was concluded, after careful examination, that the gaskets had been distorted due to excessive pressure applied to the extremities of the minor axis in order to prevent leakage at the ends of the major axes. Subsequent investigation revealed the machined surfaces of the seats did not overlap properly at the ends of the minor axes, and the high points coincided with the areas of attack on the damaged gaskets. Refinishing the gasket seats eliminated the problem.

Bacterial Growths Get the Air

Severe corrosion under rusty deposits in an ammonia condenser prompted a food processing plant in Ohio to call on Hall Laboratories for help. Suspecting iron-fixing bacteria to be responsible for the hydrous ferric oxide deposits, Sales Engineer J. M. Harvey sent samples of water and a sample of wet deposit to Pittsburgh for investigation.

Bacteriological examination showed both iron-fixing and sulphur bacteria in the well water. Chemical examination showed the water to be high in bicarbonate hardness, with approximately 2 ppm. of iron and manganese in solution. Chlorination of the water was needed to kill the living organisms, but this would oxidize the iron and manganese and cause them to deposit, even though the iron-fixing bacteria which had been causing this were eliminated. Harvey met this dilemma by recommending stabilization of the calcium carbonate, iron, and manganese by continuous feed of threshold amounts of Calgon directly to the bottom of the well, followed by intermittent addition of hypochlorite to the discharge side of the well pump.

But this plant had everything. Now a different problem developed with an accumulation of slime in the condensers. In a new sample of wet deposit, Hall Laboratories found sulfate-reducing bacteria. Since these peculiar "bugs" thrive only in the absence of oxygen, continuous aeration of the well water was recommended to supplement the intermittent chlorination.

Operating experience has proved that aeration has been decidedly beneficial. There have been no condenser outages for cleaning, whereas formerly cleaning was necessary several times each summer.

These Whistles a Bargain, Sir!

In a Michigan plant the original soot blowing system lacked the whistles normally installed. When the steam valve was shut off after soot blowing, the vacuum produced drew gases from the ash pit through the drain into the piping. Severe corrosion resulted. Correction involved installation of the whistles to prevent vacuum by acting as vents.

Ben Franklin's advice to consider alternatives before buying a whistle lest disappointment prove payment too dear for the choice could thus be answered, "*These* whistles were a bargain, Mr. Franklin."

Industrial Water Problems Require Special Handling

There are no "stock answers" to industrial water problems. For information write, wire or call Hall Laboratories, Inc., Hagan Building, Pittsburgh 30, Pa.

Water is your industry's most important raw material. Use it wisely.

Hall Laboratories, Inc.—Consultants on Procurement, Treatment, Use and Disposal of Industrial Water

New 28" cost-saving sweeper for congested areas...

does a 3 hour sweeping job in about 24 minutes

Sweeping 3 to 7 times faster than is possible by hand, this new TENNANT Model 50 Sweeper offers an important new advantage—it *brings low-cost mechanized sweeping to both the congested and open areas.*

Its special compact design and easy maneuverability, for example, make it possible to do a 3-hour handsweeping job in 24 minutes as a rule . . . and do far cleaner work.

Pays for itself in a few months

As it travels down an aisle at 1½ to 8 mph, the sweeper's powerful *vacuum*-enclosed brush cleans a 28" path (40" with sidebrush). Does an excellent job; removes dust and dirt push-brooms can't reach. *WRITE for details; sweeper is MODERATELY PRICED.*

SPACE-SAVING DESIGN saves time in congested traffic areas. Note efficient flush-with-wall operation.

The "Model 50" has auto-type controls, handles easily. Picks up chips, sand, debris, spillage, dust, and dirt.

G. H. TENNANT Co., 2554 N. 2nd St., Minneapolis 11, Minn.

TENNANT

POWER SWEEPERS

SPECIALIZED MAINTENANCE EQUIPMENT

POWER SWEEPERS • FLOOR MACHINES • SCARIFIERS • ROOF SCRAPERS • CONCRETE ROUTERS

RIGHT FROM OUR NEW, MODERN PLANT, THE NEW...

✓ DUSTFREE
✓ BREAKDOWN RESISTANT
✓ LIGHTER IN WEIGHT
✓ MORE ABSORBENT

Write for FREE SAMPLE

Mined, manufactured and guaranteed by

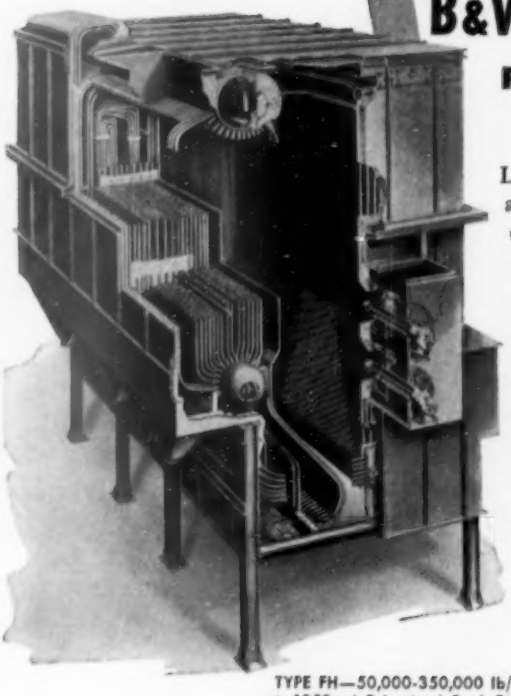
WAVERLY Petroleum Products Co.
1724 Chestnut St., Phila. 3, Pa.
Mine and Plant—Quality, Georgia

a good "family" to know for

low-cost steam

B&W Integral-Furnace Boilers

For Steam Requirements to 350,000 Lb/Hr



TYPE FH—50,000-350,000 lb/hr up to 1050 psi. Pulverized-Coal, Oil, and Gas Firing.

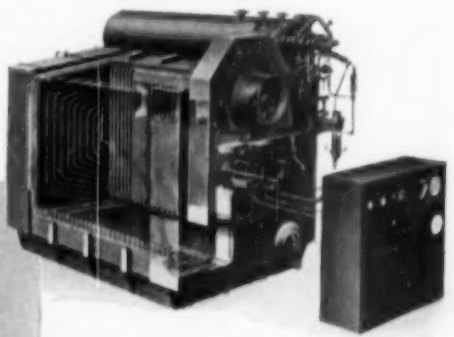
Long established as the leading choice of industrial and other users for an ever-growing variety of applications, B&W Integral-Furnace Boilers of every type and rating, and covering an unusual range of steam requirements, are *service-proved... your proof* of lower steam costs combined with higher service life. Total capacity of B&W Integral-Furnace Boilers—in service and on order—is well over 200,000,000 lb per hr. This sweeping acceptance by users is your strongest possible assurance of B&W reliability and economy.

Before planning your next installation, check with B&W for the Integral-Furnace Boiler best suited to your needs. These units are available for all standard fuels, and B&W can also meet your requirements should conditions demand the use of special fuels. Write for illustrated bulletins covering B&W Integral-Furnace Boilers in greater detail. The Babcock & Wilcox Company, Boiler Division, 161 East 42nd Street, New York 17, N. Y.

FROM THIS

TO THIS

and any capacity in-between



TYPE FM—to 40,000 lb/hr at operating pressures to 235 psi; also in service at higher pressures and with moderate superheat. Oil and Gas Firing.

COST SAVING FEATURES:

- Minimum floor space and headroom requirements.
- High fuel economy.
- Smokeless combustion.
- Adaptable to all fuels and firing methods.
- Economical fast steaming.
- Water-cooled furnace.
- Clean, dry steam at all ratings even with high boiler water concentrations.
- Quick response to wide and heavy load swing demands.
- Easy to inspect and clean.
- High availability with least attention.

BOILER DIVISION

BABCOCK & WILCOX

G-667-A

G-E LAMPS GIVE YOU MORE FOR ALL YOUR LIGHTING DOLLARS

TYPICAL OFFICE AND INDUSTRIAL AREAS WHERE 8' HIGH OUTPUT, 6' SLIMLINE, OR 4' RAPID START FLUORESCENT LAMPS ARE USED.

For better lighting:

Choose one of these 3 General Electric Lamps

for your next fluorescent lighting job

G-E High Output, Slimline and 40-watt Rapid Start—all three are excellent choices for new fluorescent installations. Each has certain specific advantages. Here's how to choose the right one for your requirements.

1 G-E 8 FOOT HIGH OUTPUT FLUORESCENT—Gives you 40% more light than any other fluorescent lamp type. Most light per fixture—costs least to maintain. Gives fine performance at very low temperature, too. The G-E High Output is now available in DeLuxe Cool and Warm whites. They give you top color rendition plus as much light as other fluorescent types in standard "whites".

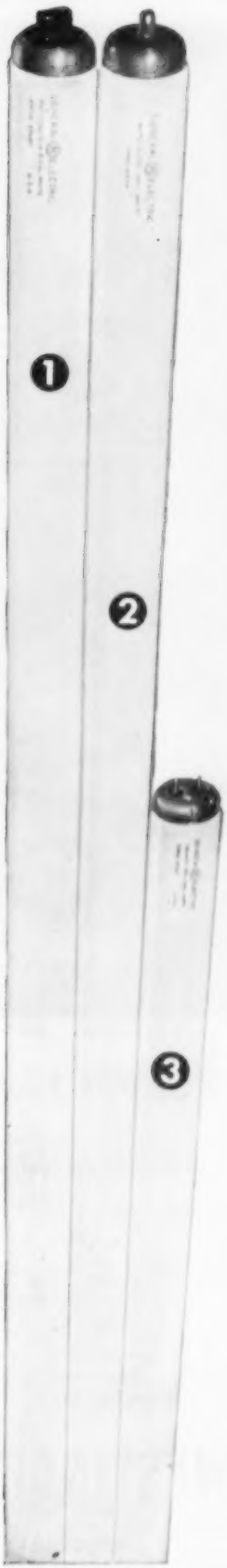
2 G-E 8 FOOT SLIMLINE—Preferred in many installations where ceilings are low and where you want lower fixture brightness and less reflected glare. Their 8 foot length and high efficiency make slimlines lower in first cost *and in maintenance* than any 4 foot lamp system.

3 G-E 40-WATT RAPID START—Your best choice where the flexibility of 4-foot lamps is preferred. Rapid start principle eliminates need for starters without sacrifice in efficiency. G-E 40-watt Rapid Start lamps light smoothly in less than 2 seconds.

For more information on how G-E fluorescent lamps can help you get the most from your lighting installation (specify store, office or factory) write: Large Lamp Dept., General Electric Co., Dept. FM-4, Nela Park, Cleveland 12, Ohio.

Progress Is Our Most Important Product

GENERAL ELECTRIC



Use the Best . . . Use Westinghouse for Fume, Vapor and Dust Exhaust!

VENTILATING SETS
Completely self-contained for indoor or outdoor installation. Two types: Direct connected or V-belt driven.

INDUSTRIAL FANS
For dust control, collecting and conveying wastes or raw materials.

SILENTVANE FANS
Quiet and efficient . . . designed for wide range of commercial and industrial uses.

AXIFLO FANS
High efficiency, large volume. Available in straight-through and elbow types.

*No. 2 of a Series

Put Air to Work Economically for:

1. Heating and ventilating
2. FUME, VAPOR AND DUST EXHAUST
3. Make-up air for balanced ventilation
4. Cooling and dehumidifying
5. Electronic Air Cleaning
6. Mechanical Draft for Steam Boilers

For complete application service, call your Consulting Engineer or your nearest Sturtevant Division Sales Engineer . . . or write Westinghouse Electric Corporation, Sturtevant Division, Dept. 19D, Hyde Park, Boston 36, Mass.

WESTINGHOUSE AIR HANDLING

YOU CAN BE SURE . . . IF IT'S Westinghouse

J-80581

FACTORY / CATALOG NEWS
Begins on page D-31

To get these catalogs, circle item numbers on the Reader Service card next to back cover.

148—Oil - Absorbents Dispenser. Keeping floors dry and non-slippery should be a cinch with the handy dispenser shown in this data sheet. Describes slot-type release that makes dispensing easy; screen top that permits salvaging of absorbents. *Oil-Dri Corp. of America.*

149—Hose and Fittings. Condensed Catalog C-101 briefly describes brass tube fittings, drain and shut-off cocks, flare fittings, steel and stainless steel fittings, permanently attached hose assemblies, heavy-duty bulk hose, re-usable hose ends. 8 pages. *Weatherhead Co.*

150—Packaged Steam Generators. Bulletin SG-100 explains with the aid of a diagram electrode principle that assures 98½% efficiency. Discusses construction, water supply and condensate return, boiler trim. Lists capacity ratings and dimensions. 6 pages. *Pantex Mfg. Corp.*

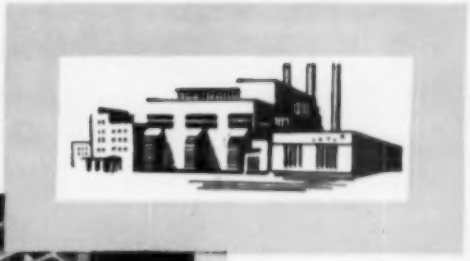
151—Mobile Phone. This bulletin features the "Imp," a mobile radiotelephone designed for low-power industrial radio service. It suggests many uses. Contains tube line-up, transmitter, receiver, and general specifications. Lists features. *Kaar Engineering Corp.*

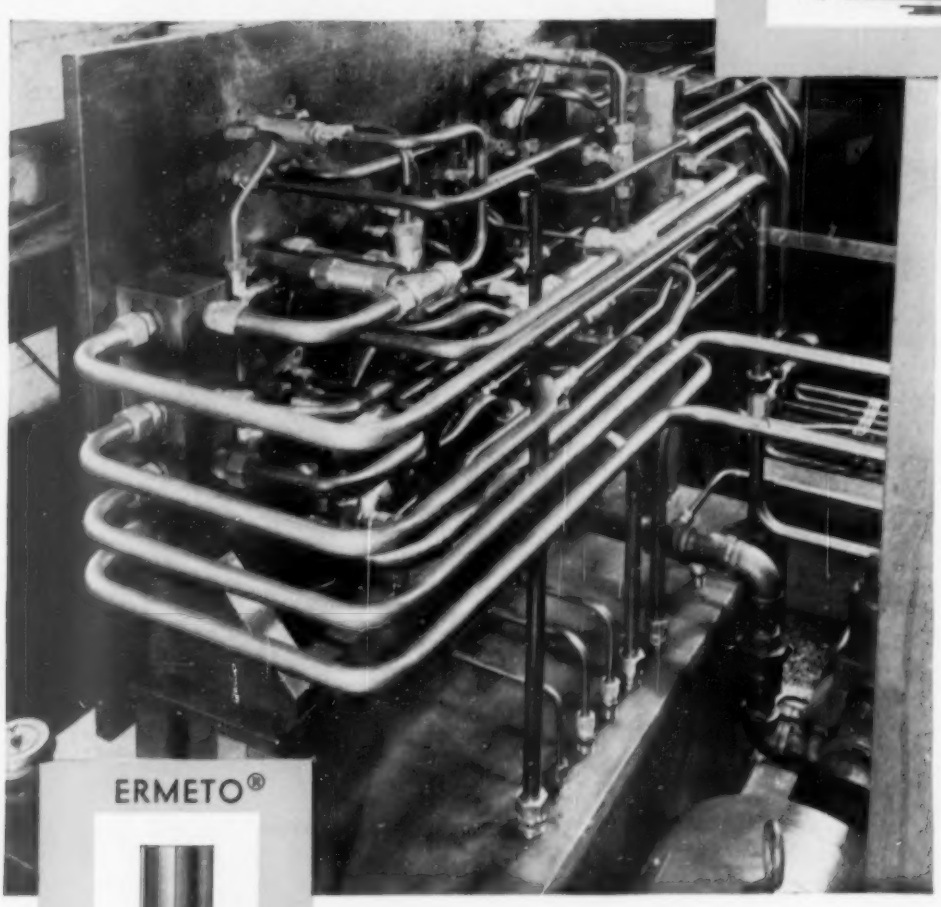
152—Jacks. Manual contains informative sections on jack types, selection (including dimension data), maintenance and safety, and application photos. Covers ratchet, screw, air motor, hydraulic, air hydraulic, and special jacks. 38 pages. Catalog 204. *Duff-Norton Co.*

153—Generators. Bulletin IGG-155 features inert gas generators for protection against fire and explosion where flammable gases, liquids, or other materials are handled. Discusses high-pressure systems for constant or varying demands. 10 pages. *Roots-Connersville Blower.*

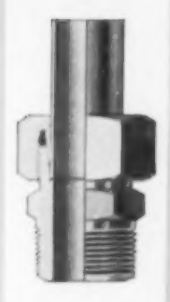
154—Hose and Fittings. Hose assemblies, re-usable fittings, and all-purpose hose for many applications are described and illustrated in Bul-

When the pressure is on...





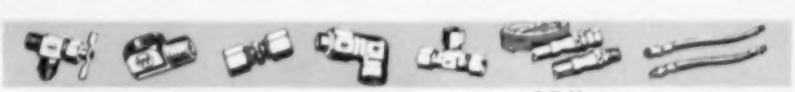
ERMETO®



When the pressure is on and positive vibration-resistant connections are a must . . . specify Weatherhead Ermeto® Connectors. Installation can be made in seconds with standard bench tools. There's no flaring . . . no threading . . . no welding . . . no soldering. The cutting and bowing action of the sleeve assures an unyielding leakproof seal . . . a joint that can be disassembled and reassembled time and time again. Write The Weatherhead Company for detailed data and application information.

For ready reference on the complete Weatherhead line, see pages 264-270 of the Master Catalog of Fluid Power Products.

WEATHERHEAD *YOUR ONLY SINGLE-SOURCE LINE of HYDRAULIC HOSE and FITTINGS*

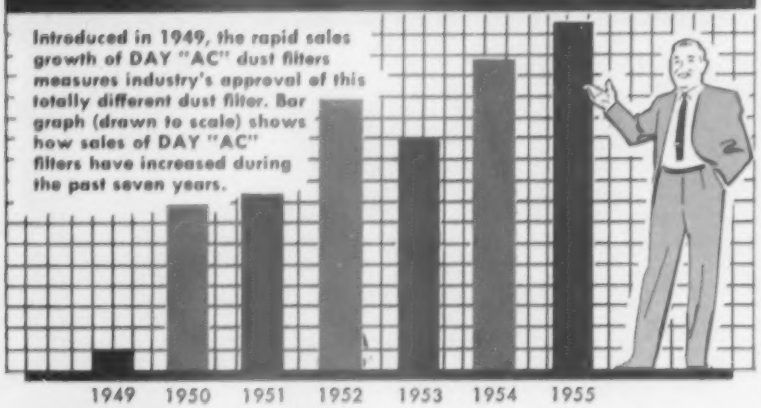


Drain and Shutoff Cocks | Brass Tube Fittings | Selflign | SAE 37° Flare (JIC) Fittings | Ermeto® | Bulk Hose and Reusable Hose Ends | Hose Assemblies

THE WEATHERHEAD CO., FORT WAYNE DIVISION, DEPT. G-4
128 WEST WASHINGTON BLVD., FORT WAYNE, INDIANA
In Canada: THE WEATHERHEAD CO. LTD., ST. THOMAS, ONTARIO

DAY REVERSE JET DUST FILTERS

HAVE EARNED INDUSTRY'S ACCEPTANCE



Introduced in 1949, the rapid sales growth of DAY "AC" dust filters measures industry's approval of this totally different dust filter. Bar graph (drawn to scale) shows how sales of DAY "AC" filters have increased during the past seven years.

HERE'S WHY — DAY Reverse Jet Dust Filters HAVE EARNED ACCEPTANCE!

Utilizing the Hersey principle of reverse air cleaning, DAY "AC" dust filters brought industry a needed, long overdue, improved dust filter. This filter has many benefits never before found in any dust filter equipment.

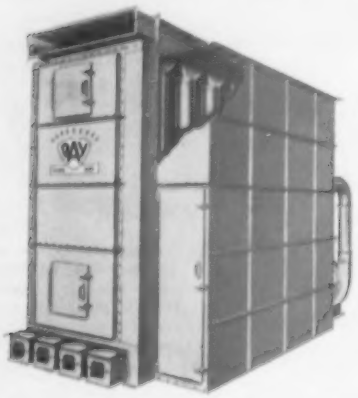
● NEW HIGH EFFICIENCY PERFORMANCE—This filter provides efficiencies measured as high as 99.99+%. This assures cleaner air and higher product recovery.

● NEW FILTER MEDIA—DAY *felted* filter media traps more dust than woven fabric. Felt gives higher efficiency, longer life and has same pressure drop as woven fabric.

● NEW DESIGN FEATURES—The Hersey principle of reverse jet cleaning, DAY self-adjusting blow rings, sanitary square-to-round air inlets, automatic-continuous operation, superior filter media, are just a few of the features introduced by DAY.

● NEW FILTER TUBE CLEANING—Patented self-adjusting blow rings clean the entire filter tube automatically and continuously, to give DAY filters an air handling capacity 5 times higher than ordinary filters.

● NEW LOW INSTALLATION COSTS—Unit sub-assembly saves time and money—up to 75% on filter erection costs.



Licensed by H. J. Hersey, Jr.

The DAY "AC" Reverse Jet Dust Filter is the largest selling filter of its type in the world!

Place the successful operation of your dust control system in our hands. Experienced DAY Application Engineers will survey your plant and supply you with engineered recommendations. With DAY there is no divided responsibility. Our guarantee of satisfaction is backed by 75 years of experience.

Bulletin 559 gives important facts and complete description of the DAY "AC" dust filter. Write toDAY for your copy of this informative 24-page bulletin.

75 YEARS — DAY — SERVING INDUSTRY SINCE 1881

The DAY Company

858 Third Avenue N. E., Minneapolis 13, Minnesota
IN CANADA: P. O. Box 70R, Fort William, Ontario
Branch Plants: Buffalo, Fort Worth and Toronto, Ontario
Representatives in Principal Cities

FACTORY / CATALOG NEWS
Begins on page D-31

To get these catalogs, circle item numbers on the Reader Service card next to back cover.

letin S2. Single and double wire braid rubber-covered hose and double fabric braid hose are shown. 12 pages. *Stratoflex, Inc.*

155—Air Conditioning Equipment. Gas-operated equipment is featured in this 12-pager. Includes summer air conditioner, all-year air conditioners, evaporative water coolers, and a 25-ton water chiller (steam operated). Schematic diagrams show operation. *Servel, Inc.*

156—Fluorescent Portable Lamps. This folder will show you how to light up dark work areas with vapor, moisture-tight, fluorescent portable lamps. Describes cool, glare-free, insulation features. Shows lights stepping up efficiency on 12 jobs. *Day-Ray Products, Inc.*

157—Plumbing and Drainage Products. Bulletin 56-1 describes systems for wall-type plumbing fixtures; covers roof drains, floor drains, interceptors, cleanouts, access doors, shock absorbers, hydrants, pipe line strainers. Cutaway drawings. 12 pages. *J. A. Zurn Mfg. Co.*

158—Water Supplies. Described in this brochure are a collector for utilizing infiltrated water at its source; a natural gravel vertical water well for low-volume users; an infiltration gallery that costs fraction of sand filtration plants. *Ranney Method Water Supplies, Inc.*

159—Protective Coatings. 32-page booklet is a short course in practical paint technology. Discusses definition and types of coatings, cathodic protection, surface preparation of steel and concrete for coating, rust-inhibitive primers. Folder No. 754. *Inertol Co.*

160—Power Tools. A complete line of Delta tools for metalworking is briefly described and illustrated in this 8-pager (Form AD831R). Companion piece covers complete line of woodworking tools (8 pages, AD868R). *Rockwell Mfg. Co.*

Turn the page

★ ★ ★ FLASH

SPEEDI-DRI SPOTLIGHT

★ ★ ★ FLASH

A REPORT TO MANAGEMENT ON INDUSTRIAL MAINTENANCE

VOL. II | APRIL 1596 | No. 2

Sol-Speedi-Dri Now Flecked with Green

OUT OUR WAY — BY J. R. WILLIAMS

OWOOH! FOR NINE YEARS HE'S BEEN STANDIN' ON SOL-SPEEDI-DRI AN' HE DON'T KNOW WHAT IT'S FOR!
BECAUSE IT'S NONE OF MY BUSINESS! THEY GOT MEN DOIN' THAT!
WHY IS IT SOME PEOPLE HAVE GOTTA BREAK A LEG OR ARM OR SUMPIN' BEFORE THEY BOTHER TO FIND OUT ABOUT SOL-SPEEDI-DRI?
THE HERMIT
J.R.WILLIAMS

FIVE FACTORS THAT CONTROL FINAL ABSORBENT COSTS

Price is an important factor in your choice of a mineral floor absorbent—but, obviously, not the *only* consideration. Here are some other things to weigh before making your selection:

ABSORPTION
Does the material thoroughly absorb and retain oil and grease deposits—keep floors slipproof under foot? If not, it means more frequent application, requiring more material and manpower. And what price do you put on a crippling injury caused by a slip or fall?

VOLUME WEIGHT
The more volume you get per pound of absorbent, the more coverage you get (a pound of feathers spreads farther than a pound of sand)—and the more economical it is for you to use.

UNIFORMITY
Do you get uniform volume weight and efficiency—bag after bag, all year long? You're paying a uniform price.

ABRASIVENESS
Is the material gritty and abrasive to the extent it could damage working parts of machinery?

DUST
Does the absorbent create dust when applied or when subjected to heavy traffic. A dusty absorbent causes serious maintenance problems—affects efficiency and morale of workers.

Judge Sol-Speedi-Dri by these factors—and you can't logically use any other mineral absorbent!

Top-Selling Oil and Grease Absorbent Has New "Trademarking," New Performance Qualities

Beginning with shipments from our plant in mid-April, industrial maintenance men can be sure they're getting the "finest of oil and grease absorbents" for their plant floors. For Sol-Speedi-Dri—long the answer to that description—now has a *new look*. Scattered through each bagful are granules of pure Sol-Speedi-Dri *colored green* by a new process. These green flecks have been developed for your protection. They're a trademark that clearly identifies *double S-d* quality—and none other!

VASTLY IMPROVED PRODUCT
Green-flecked Sol-Speedi-Dri is new in more ways than one. Speedi-Dri Corporation's research laboratories have made dramatic improvements in basic *double S-d* properties — improvements that mean easier application and removal, more efficient performance, and greater dollars-and-cents economy.

VOLUME WEIGHT, COVERAGE
The amount of absorbent needed to cover your floors is in direct ratio to the amount of labor required to spread the material—and the amount of your annual maintenance bill. The new, improved Sol-Speedi-Dri is uniformly lighter in volume weight—spreads farther, requires less manpower, trims your costs.

ABSORPTION, RETENTION
Sol-Speedi-Dri's harder, thirstier, more dustfree granules absorb and retain oils and greases more efficiently than ever—leave floors clean, dry, safe under foot.

NEW LOOK FOR BAG
Green-flecked *double S-d* is new outwardly, too. Its bag has a brand-new design (see sample version below)—and features two sturdy kraft paper walls, plus a 90-lb. asphalt liner with siftproof seams.

NEW VALUE FOR YOU
For real efficiency and economy in floor maintenance, get green-flecked Sol-Speedi-Dri—your guarantee of dependable quality!

SEND FOR YOUR FREE SAMPLE

SPEEDI-DRI CORPORATION
(A subsidiary of Minerals & Chemicals Corp. of America)
80 Essex Turnpike, Menlo Park, New Jersey

☐ Send me a free sample of the new improved Sol-Speedi-Dri

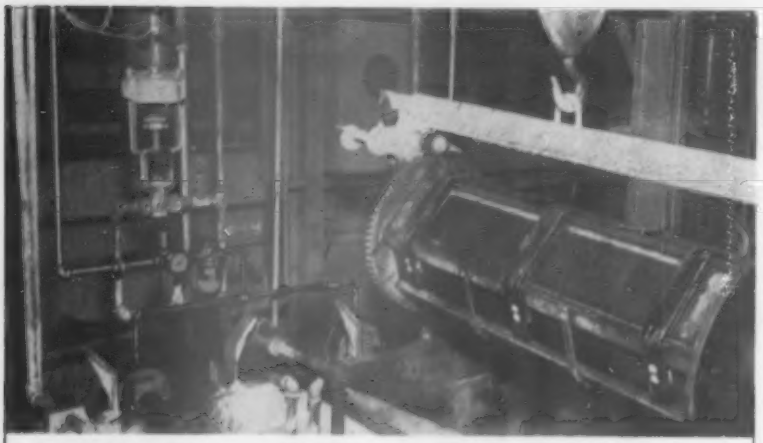
Name_____

Company_____

Address_____

City_____ State_____

DISTRIBUTED IN CANADA BY G. H. WOOD & COMPANY, LTD., TORONTO



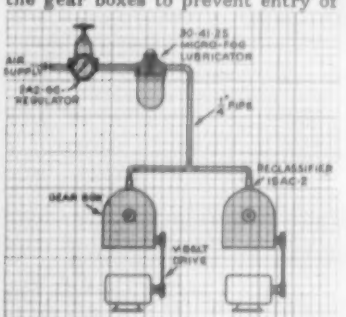
Costly Gear Repairs Ended By Norgren MICRO-FOG Lubrication

... Acid fumes "locked out" of gear boxes on plating tanks at Wagner Electric Corporation

The Problem: At the Wagner Electric Corporation, St. Louis, Missouri, baskets containing parts to be zinc plated in a hot acid solution are mechanically agitated by a gear drive.

With the former drip feed lubrication method, acid fumes entered the gear boxes, contaminating the lubricant and destroying the gear box seals. Loss of lubricant, hot-running gears plus corrosion by the contaminated lubricant greatly accelerated gear wear and resulted in frequent costly repairs.

The Solution: Three years ago, the Norgren MICRO-FOG Lubrication System shown in the picture above was installed to lubricate the gear drives on two plating tanks. The Norgren Pressure Regulator maintains a constant pressure in the gear boxes to prevent entry of

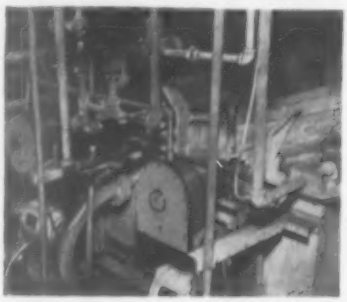


acid fumes. The Norgren MICRO-FOG Lubricator accurately meters oil flow and delivers a continuous fog of fresh, clean oil to the gears.

What Norgren Micro-Fog Is:

Norgren MICRO-FOG is an airborne suspension of extremely small oil particles (.00007874" or less in diameter). Because the oil particles are so small, they can be conveyed long distances through complex piping systems without reclassifying and flooding the lines with oil —a condition formerly not possible with conventional oil-fog systems.

The Results: Norgren MICRO-FOG automatically coats the gears with a continuous film of fresh oil, reducing gear wear and corrosion.



The gear box seal problem has been entirely eliminated because seals are no longer required. Much less lubricant does a more thorough lubrication job—with a substantial saving in lubricant cost. Maintenance costs have been radically reduced.

Without obligation, learn how Norgren MICRO-FOG Lubricators can provide more efficient lubrication and reduce costs in your plant. Call your nearby Norgren Representative listed in your telephone directory — or **Write the Factory for New No. 700 Catalog.**

C. A. Norgren Co.
3421 So. Elati St., Englewood, Colo.

Pioneer and Leader in Oil-Fog Lubrication Since 1930

To get these catalogs, circle item numbers on the Reader Service card next to back cover.

161—Coolant Clarifier. Bulletin features the "Roto-Flo" 15 for machine tools working steel and iron parts. Application photos show how it's readily installed without additional piping on many machines, easily modified to fit others. *U. S. Hoffman Machinery Corp.*

162—Heating and Cooling Coils. Case histories in Bulletin No. 154 show how savings were made in 12 different processing operations when companies replaced pipe coils with "Platecoils." Discusses nine reasons they cost less than pipe coils. 16 pages. *Tranter Mfg., Inc.*

163—Puller. Bulletin 146-G calls this tool that lifts or pulls in any position "the tool with 1001 uses." Shows applications in horizontal pulling, pulling at any angle, vertical lifting. Specs. 6 pages. *Chisholm-Moore Hoist Div.*

164—Masonry Bits. Featured in Catalog No. MBC-55 are carbide-tipped bits for drilling holes ⅛-6 in. diameter in tile, brick, concrete, granite; any masonry. Lists chuck and shank requirements for adapting to electric or pneumatic hammers. *New England Carbide Tool Co.*

165—Portable Electric Tools. Standard Catalog 1956 covers a complete line. Some of the tools described and illustrated are drills, screw guns, sanders, polishers, grinders, saws, hammers. Includes many attachments, accessories, kits. 24 pages. *Black & Decker Mfg. Co.*

166—Intercommunication Systems. Bulletin offers automatic dial, executive station, manual switchboard, specially designed switchboard, pushbutton limited line systems. Supplementary bulletins on individual systems give further details. *Kellogg Switchboard & Supply Co.*

167—Lubrication. "A Guide to Better Bearing Lubrication" contains sections on oil and grease lubrication, high-temperature applications,

Turn to page D-70

It takes no investment to give your employees this wanted convenience

Costs you nothing (yet makes a profit)—and does so much for sound employee relations.

At work, as at home and everywhere else, people want refreshment. So universal is this desire, it is fast becoming an accepted practice in American life.

Of all beverages in America, cola is the most popular. And Pepsi is by far America's fastest growing cola drink. Why not give your employees this wanted convenience? Profits can be used for many desirable purposes.

And remember, Pepsi on the job supplies an important addition to your safety program. A stop for refreshment eases tension—and that's a safety factor.

Write today to the address below. We'll be happy to discuss this important program with you.

SOUND EMPLOYEE RELATIONS include:

- Air Conditioning
- Better Lighting
- Health and Insurance Benefits
- Safety Programs

And

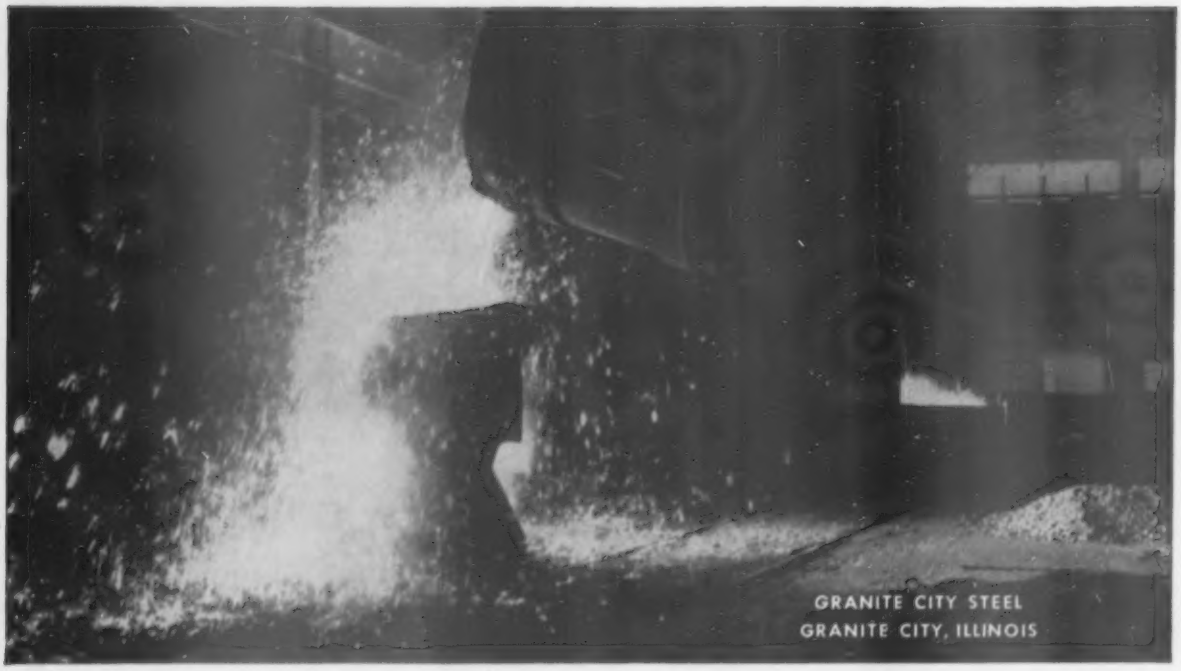
REFRESHMENT ON THE JOB

These are just a few of the many Vending machines made by leading manufacturers. There are many more, of different designs and capacities, available to fit your needs.

Industrial Sales Division

Pepsi-Cola Company

3 West 57th St., New York 19, N. Y.



Granite City saves fuel, raises production and quality with Cities Service Heat Prover!

Nation's 14th largest steel producer uses Heat Prover on soaking pits, open hearth furnaces and on their annealing furnaces.

Granite City Steel burns enough fuel in one year to heat a five-room house for 38,000 years!

Obviously, if this fuel burns inefficiently, the loss could be staggering. But Granite City has no worries on that score. "Thanks to the portable Cities Service Heat Prover, we get better fuel efficiency, better quality, greater production than ever," they report.

"Because it provides a quick, highly accurate check of fuel-air ratio, the Heat Prover has proved invaluable in controlling combustion conditions in open hearth furnaces, soaking pits, and annealing and normalizing furnaces. In a matter of seconds it tells our engineers how efficiently the furnaces are working—whereas former tests often took hours and didn't provide as accurate a picture. Anyone in this business can probably benefit from this ingenious device."

Supplied and maintained free by Cities Service, the remarkable Heat Prover is today used and applauded by scores of major steel producers. If you'd like to learn how it could simplify your operation as it has theirs, talk with your local Cities Service Lubrication Engineer. Or write: Cities Service Oil Company, Sixty Wall Tower, New York 5, N. Y.

20TH CENTURY BLOWGUN—a bazooka—is readied by technicians for tapping open hearths. They are part of Granite City's 4800 skilled employees.

HEAT PROVER AT WORK at back of open hearth furnace. In minutes it provides accurate check on furnace efficiency—saves hours required by former testing.

CONTROL TOWER at blooming mill guides ingots as they pass through rollers. Granite City has capacity of 1,200,000 net tons of ingots annually.

CITIES SERVICE

QUALITY PETROLEUM PRODUCTS

Glidden Spray-Day-Lite gives two-coat results in just one spraying...*and cuts painting costs!*

Here's the fastest, easiest way to increase lighting efficiency and give plant interiors a new look—with Glidden Spray-Day-Lite!

It's higher hiding . . . one spraying produces a smooth, solid covering over grimy, dirty and badly discolored surfaces. And you never have to cover machines or interrupt production. With Spray-Day-Lite, you are assured of maximum fog and mist control. Minute paint particles dry before they reach the floor, can be swept up like dust!

What's more, you don't have to bother with thinners. Spray-Day-Lite comes ready for spraying or brushing in non-yellowing white and 10 attractive colors. Fill in and mail the coupon below for complete details.

Glidden

Professional Finishes

The Glidden Company
Maintenance Finishes Division
Cleveland 2, Ohio

The Glidden Company • Dept. FM-456 • 11001 Madison Ave. • Cleveland 2, Ohio

☐ I am interested in details of Glidden Painting Analysis.

I am particularly interested in:

☐ SPRAY-DAY-LITE.
☐ NEV-A-RUST; other anti-corrosion finishes.
☐ Product demonstrations for training purposes.
☐ Color Studio Service.
☐ New Glidden complete-line catalog.
☐ Vinyl and epoxy coatings.

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Address_____

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Everybody LOVES fresh Linens...

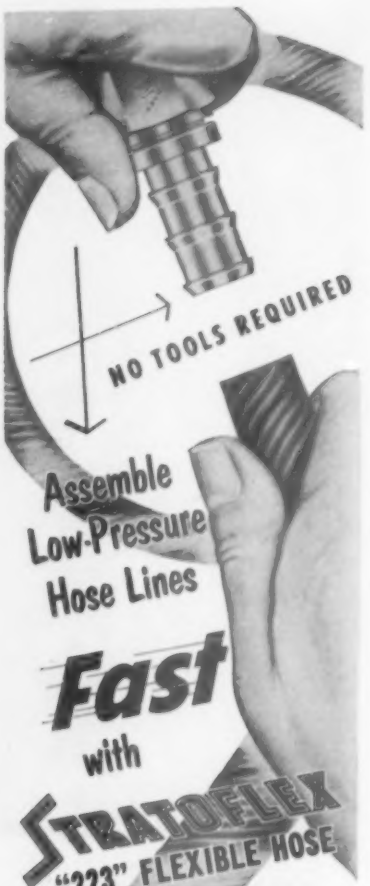
(You know they do!)

. . . and as an alert plant manager you realize that your employees and visitors alike prefer the hospitable touch of soft cotton towels in your washrooms. But did you know how really inexpensive it is to provide this morale-boosting comfort through LINEN SUPPLY SERVICE? It would pay you to check. Call your LOCAL LINEN SUPPLIER (under "Linen Supply" or "Towel Service" in the classified phone book).

M. SNOWER AND COMPANY

361 W. Chestnut St., Chicago, Ill.

Division of Opelika Manufacturing Corp., furnishers of Textiles in all forms to The Linen Supply Industry.



Assemble Low-Pressure Hose Lines

Fast **with**

STRATOFLEX "223" FLEXIBLE HOSE

STRATOGRIP HOSE FITTINGS

Fittings and hose designed for quick make-up by hand without tools. Excellent for automotive and industrial lines carrying water, hot oil, gasoline, diesel fuels, anti-freeze, L-P Gas, vacuum gage and air applications. Double fabric braid. Impregnated fabric cover. Working pressures to 250 psi. At your dealer.

Write for BULLETIN
Dealerships open in some areas.

STRATOFLEX

STRATOFLEX, [illegible] FORT WORTH, TEXAS
P. O. BOX 10398

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LOS ANGELES AND TORONTO
SALES OFFICES
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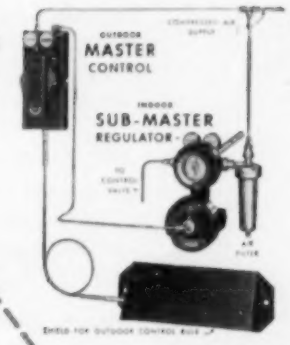
STRATOFLEX OF CANADA, INC. TORONTO 18, ONTARIO

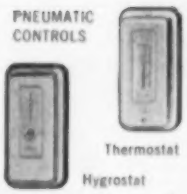
MASTROL SYSTEM for Forced Hot Water Heating



PNEUMATIC CONTROLS

Series 100 Recording Controller and V-Port FLOWRITE Control Valve

PNEUMATIC CONTROLS



Thermostat

Hygrostat

LIMITEM Thermostat

Pneumatic Switch

3-Way FLOWRITE Valve

FLOWRITE Diaphragm Valve Single Seat

Convector and Unit Air Conditioner Valves

Packless Type

Series 100 Indicating Controller

3" POWERSTROKE Damper Operator

Static Pressure Controller

6" POWERSTROKE Damper Operator

POWERS

TEMPERATURE and HUMIDITY CONTROL

For Heating and Air Conditioning Systems Industrial Processes

Water Heaters • Heat Exchangers Jacket Water Cooling

All Types of Baths Hospital Hydrotherapy

Most of your control problems can be solved successfully with the aid of a POWERS engineer and the proper application of some of our modern products. Why not profit from our 60 years of experience? There's no obligation. Phone or write our nearest office.

No. 11 Self Operating Temperature Regulator

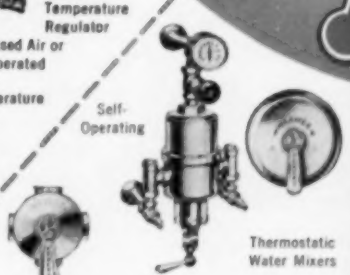
Available with Single or Double Seat and 3-way Mixing Valve

ACCRITEM Temperature Regulator

Compressed Air or Water Operated

No. 11 Temperature Indicating Regulator

Self Operating



Self-Operating

Thermostatic Water Mixers

THE POWERS REGULATOR CO.

Established 1891 • Offices in 60 Cities • See Your Phone Book

Factory and General Office — Skokie, Illinois

CHICAGO 13, ILLINOIS • 3819 N. Ashland Ave.
NEW YORK 17, NEW YORK • 231 East 46th Street
LOS ANGELES 26, CALIF. • 3200 West Temple St.
TORONTO 15, ONTARIO • PO Box 182, Weston
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2 of the 10 TOP PLANT Award Winners of 1956

use a BRULé TRASH BURNER

★ Plants using BRULé Trash Burners find that this method of incineration contributes in many ways to all around smoother and better operation. The increasing installations in new plants and those remodeling are evidence of the value placed upon this modern, dependable, low-cost incineration.

1 —Time and costs are saved in various ways

2 —There are no daily obstructions due to trash piles in the manufacturing area

3 —Costly fires are prevented that usually result from carelessness in the ordinary burning of wastes and through spontaneous combustion where trash piles are not moved for long periods

4 —Insurance premiums can be lowered

5 —All around plant neatness contributes to employee morale

6 —You save money burning trash in an incinerator whereas costs for manual handling and cartage are very high in comparison

These are but a few of the results you get with a BRULé Incinerator.

- There are many types for indoor and outdoor installation—portable and stationary—so that every individual need can be supplied.
- The type featured here is our PORTABLE FG4-T. It is available in 500, 300, and 200 lbs. per hour capacity. Stationary type incinerators are available in capacities from 400 to 5000 lbs. per hour.
- Have one of our incinerator engineers give you all of the details and show you exactly how you will SAVE MONEY with a BRULé unit.

KEEP PLANT TRASH OFF THE PATH OF PROGRESS

BRULÉ INCINERATORS, 407 So. Dearborn St., Chicago 5, Ill.

☐ Send descriptive literature. ☐ Name of nearest sales office.

Company .....

Your name .....

Address .....

City ..... Zone ..... State .....

In Canada: 150 Perth Ave., Toronto, Ont.

To get these catalogs, circle item numbers on the Reader Service card next to back cover.

minimum friction applications, protection against moisture, protection of idle machinery, cleaning. 30 pages. *SKF Industries, Inc.*

168—Scaffolds, Rolling Towers. This bulletin may provide the answer to your overhead maintenance problems. Shows units for indoor or outdoor use, including aluminum units easily assembled to meet any requirement. Application photos. *Safway Steel Products, Inc.*

169—Lighting. Both modular ceiling lighting systems and pendant lighting units are described in this 12-pager. Covers installation, assembly, design factors, unit types, specs. Lists brightness ratio from task to ceiling, walls, floors, etc. 12 pages. *Wakefield Co.*

170—Pumps. Catalog UM-56 features pumps for continuous, precise metering, and proportioning of small volume flows. Tells where they're used, how they operate, how to select. Data on servicing, special constructions, drives and controls. 20 pages. *Hills-McCanna Co.*

171—Floor Maintenance Service. This booklet will tell you how you can get technical advice on your floors, including a study of your floor needs, recommendation for treatment, instruction on maintaining, periodic inspection. 8 pages. *Masury-Young Co.*

172—Scaffolding. Bulletin G205R (8 pages) shows equipment for painting and cleaning, electrical work and maintenance, plant repair and maintenance, special jobs. A companion Bulletin ASF-1 features a handy fold-a-way aluminum scaffold. *Patent Scaffolding Co.*

173—Television Camera. Here are details on "Tel-Eye," a unit that performs functions of a complete camera chain, for use with standard receiver or monitor. Electrical, optical, mechanical specs. *Allen B. Du Mont Laboratories, Inc.*

Turn the page

• Soap solution • Calcium hypochlorite •

• Water containing abrasive particles • Carbon slurry • Ferric hydroxide •

Soap solution containing sand and ground glass • 25% grape juice concentrate •

• 50% caustic soda • Ferric sulphate • Ammonium sulphate • Demineralized water

Trisodium phosphate • Reactivated carbon • 1% chlorine solution • Sulphuric acid •

• 10% chromic acid • Humic acid • • Weak black liquor •

Waste sulphite liquor • Bleach liquor • • Slurries

Acid mine water • Liquid latex •

• Alkylaryl sulfonate •

• Sodium hydroxide •

• Calcium hydroxide •

• Calcium bisulphite •

Calcium hypochlorite •

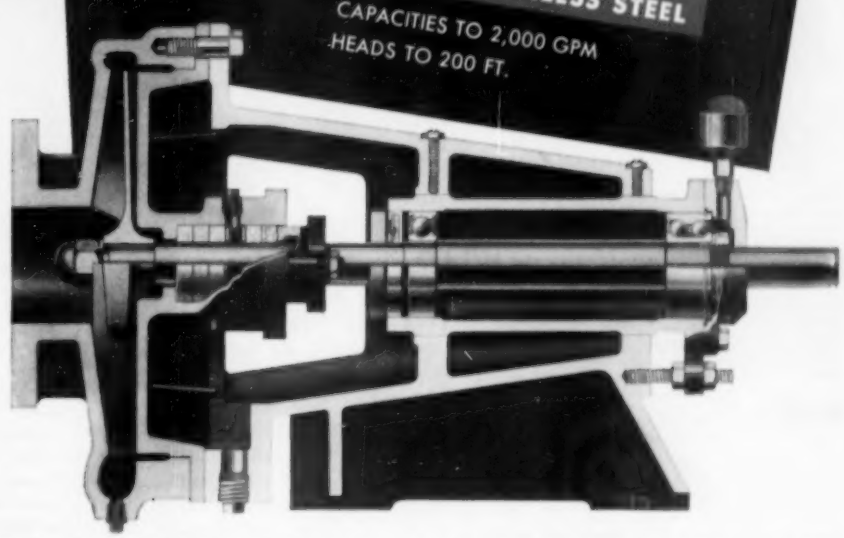
• Demineralized water

One pump handles all these problem liquids

DE LAVAL CPO PROCESS PUMP

WITH KK-20 STAINLESS STEEL

CAPACITIES TO 2,000 GPM
HEADS TO 200 FT.



The De Laval CPO Process Pump has stainless steel parts where it comes in contact with the liquid. The casing, end head, stuffing box, impeller, seal ring and gland are all of De Laval KK-20 (20-28 stainless with molybdenum and copper). The shaft and lock nut are made of other suitable stainless steels. • Three bearing pedestals accommodate nine wet end sizes. Off-the-shelf parts in ferrous and non-ferrous combinations permit changing size or metallurgy after installation. CPO pumps are available with both conventional packing and mechanical seals.

WRITE FOR BULLETIN 1125-B

DE LAVAL *Centrifugal Pumps*

DE LAVAL STEAM TURBINE COMPANY

804 Nottingham Way, Trenton 2, New Jersey

DL-331

Flammables

STORE SAFE and POUR SAFE

with this Approved Double-Duty Safety Container!

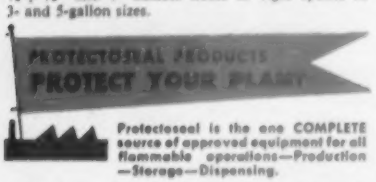
PROTECTOSEAL

STOR-por

Dispenser

combines the functions of a Safety Can with those of a Supply Can to perform both services with one piece of equipment—eliminates cost of an extra can—does away with necessity of using a funnel with its lack of control and possibility of dangerous spillage.

The Protectoseal Stor-Por Dispenser is Underwriters Laboratories and Factory Mutual Laboratories approved. Both fill opening and pouring spout have double perforated metal fire baffles to prevent ignition of contents. Easy-working valve at base of flexible spout is operated by carrying hand and gives positive control while pouring. Available with ¼" and ⅛" flexible hoses in 1- and 2-gallon sizes, and ¾", ⅜" and 1" flexible hoses or rigid spouts in 3- and 5-gallon sizes.



Protectoseal is the one COMPLETE source of approved equipment for all flammable operations—Production—Storage—Dispensing.

All Protectoseal Fire Preventive Equipment is designed by specialized engineers for time-saving and convenient use, and in most cases actually speeds production.

Send for NEW Flammables Equipment Guide Chart. Illustrates and describes 30 approved Fire Protective Safety Devices and their uses.

Fill in coupon and attach to company letterhead. West Coast Warehouse: Los Angeles, Calif. In Canada: Safety Supply Co.—Toronto.

THE PROTECTOSEAL COMPANY
1962 S. Western Ave., Chicago 8, Ill.

Without cost or obligation, send "A Guide to Selection and Use of Protectoseal Equipment for the Safe Storage, Handling and Use of Flammables."

Name_____ Title_____

Company_____

Address_____

City_____ Zone_____ State_____

FACTORY / CATALOG NEWS

Begins on page D-31

To get these catalogs, circle item numbers on the Reader Service card next to back cover.

174—Floor Cleaners. Condensed bulletin shows just a few of the floor scrubbing and polishing machines, heavy-duty vacuum cleaners, hand blowers and dust collectors available. A second booklet (8 pages) lists many useful attachments and sets. *Breuer Electric Mfg. Co.*

175—Electro - Chemical Corrosion Protection. Brochure discusses cathodic protection for the treatment plant — what it will do for you, where it should be used, when it should be applied, how it should be installed, how much it will cost. *Electro Rust-Proofing Corp.*

176—Wet Surface Enamel. Here's the story on "Damp-Tex," an enamel that adheres, dries, and gives good surface on wet surfaces—non-yellowing and odorless, too. Offers treatment to resist mold or mildew. Shows application photos. 8 pages. *Steelcote Mfg. Co.*

177—Cylinders. Fluid power cylinders for air and hydraulic operation are featured in Catalog No. 750A. Contains sections on features, mountings, capacities, dimensions, accessories, optional features, applications, ordering hints. 12 pages. *Hanna Engineering Works.*

178—Heat Exchangers. Two catalogs (Nos. 1149 and 1155) are offered on two types of sheet and tube exchangers. One covers single- and two-pass units (8 pages); the other, stainless steel single- and multi-pass units (4 pages). Tables. *Young Radiator Co.*

179—Automatic Valves. Bulletin No. 307 briefly describes and illustrates a line of pressure-reducing and regulating valves, relief and by-pass valves, back pressure valves, and special purpose valves for protection and control. *A. W. Cash Valve Mfg. Corp.*

180—Purifiers. Booklet presents internal, line, and receiver types for taking the dirt and moisture out of your steam and gas processing

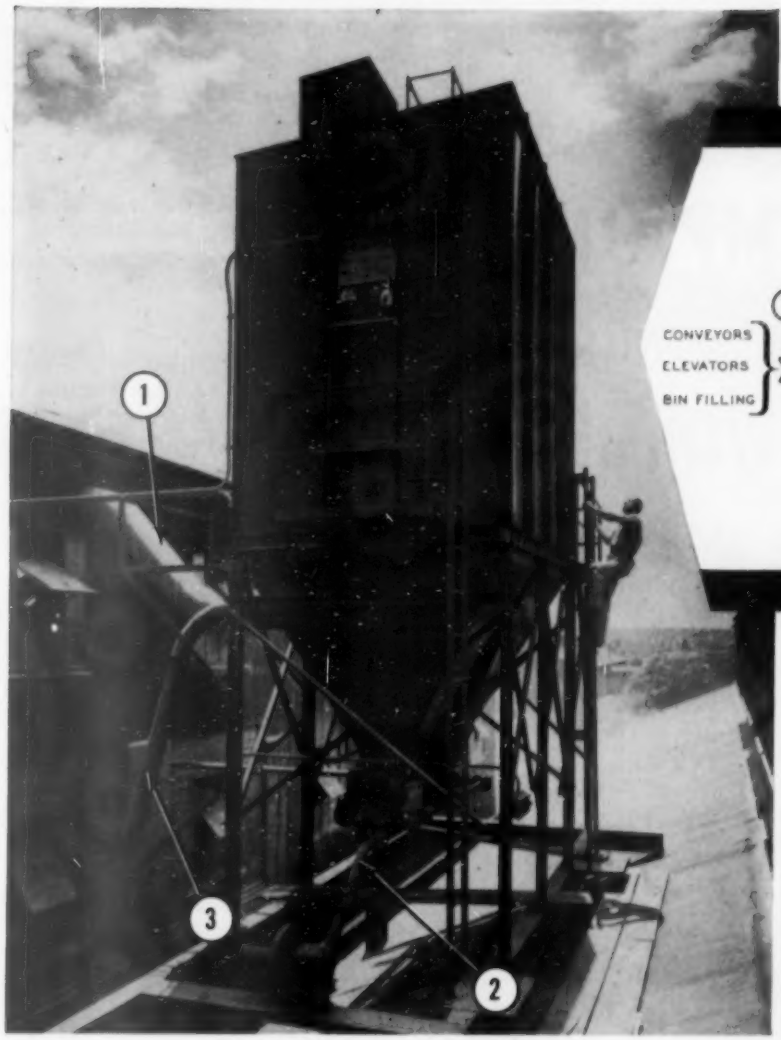
Best way to keep small fires *small* is to immediately and *automatically* notify the Municipal Fire Department. And you can do that with Gamewell Automatic Alarm devices that send the alarm as soon as a sprinkler head goes off.

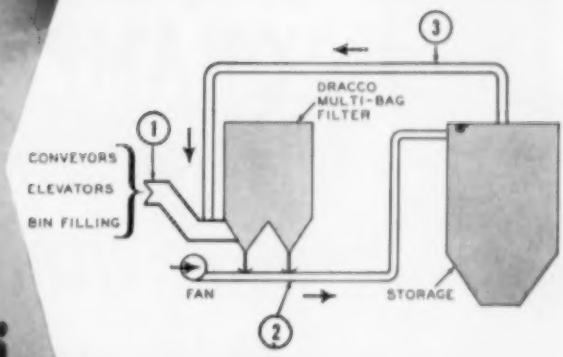
That keeps fire damage small. It reduces water damage. It frequently permits re-rating of insurance to reduce premiums.

To get the facts about Safety Engineering your plant against big fire damage, ask a Gamewell engineer to work with your plant officials. Write today.

THE GAMEWELL COMPANY
CHESTNUT STREET
NEWTON UPPER FALLS 64, MASS.

GAMEWELL®
FIRE ALARM SYSTEMS
SAFETY ENGINEERED FOR YOUR PROTECTION





Dracco dust control system at General Refractories' Baltimore plant consists of two Multi-Bag Filters like one shown at left. Each handles 7,000 cfm of dust-laden air, operates continuously on around-the-clock basis. In diagram (above) chrome dust enters filter through ①. Collected dust is air conveyed to storage automatically by ②. Line ③ exhausts dust from bin.

How to Solve a Dust Problem - *Completely*

When you try to expand the production facilities of the world's largest basic refractories plant (General Refractories Company at Baltimore), you are faced with a serious problem. This is the escape of chrome dust from materials handling and bin filling operations. What would you do?

General Refractories and Dracco engineers coordinated their abilities to provide an outstanding Dracco dust control installation which is the complete and final answer to this annoying and costly problem.

Chrome dust is now trapped at its source before it can spread, moved through an enclosed system and collected in two peak-efficiency Multi-Bag Filters. This produces better plant efficiency, improved working conditions with reduced health hazards, no threat of costly abrasive wear of machinery, and minimum housekeeping costs.

An added cost-saving feature of the Dracco system is that all recovered dust is returned directly to process bins by fan-type Airstream Conveyors for reuse. By eliminating manual handling, savings in labor costs are realized. Because of the success of this operation, Airstream Conveyors have been added to two dust filters previously installed to move dust back to process.

If you want to solve your dust problem completely, follow General Refractories' example—call in Dracco. You'll be glad you did.

DRACCO CORPORATION
4075 East 116th Street • Cleveland 5, Ohio

FREE! THE DRACCO ENGINEER. Describes Dracco solutions to many bulk materials handling and dust control problems—includes tips on improving plant efficiency . . . published quarterly. Get on the mailing list. Write on your letterhead today!

DRACCO *Performance Proved*
Airstream **CONVEYORS • DUST CONTROL EQUIPMENT**

"I'm glad we use CHAMPION Lamps around here. With the service we're getting out of 'em they're the best buy in Lamps."
CHAMPION
CHAMPION FLUORESCENT LAMPS
CHAMPION FLUORESCENT LAMPS
CHAMPION LAMP WORKS
Lynn, Massachusetts
A DIVISION OF CONSOLIDATED ELECTRIC LAMP CO.

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equipment. Steam trap specialties are also described and illustrated. Many tables and diagrams. 42 pages. *V. D. Anderson Co.*

181—Plastisol Compounds. Bulletin VP-1 discusses types, functions, and applications of two vinyl materials with many uses. Suggests use for anti-corrosion, protective coatings, abrasion-resistant decorative finishes. Tells how to apply its many forms. *United Chromium, Inc.*

182—Desurger. Here's the story on dual-acting, in-line units for eliminating damaging surge, pump pulsation and water hammer shock wherever liquids flow. Charts show smooth flow obtained in typical installations. Sizes and specifications. *Westinghouse Air Brake Co.*

183—Door Heaters. Bulletin DH-2 will tell you how to put a curtain of hot air between the outside cold and workers indoors when doors are open in the winter. Lists models for many door sizes. Discusses control methods. Shows installations. 8 pages. *L. J. Wing Mfg. Co.*

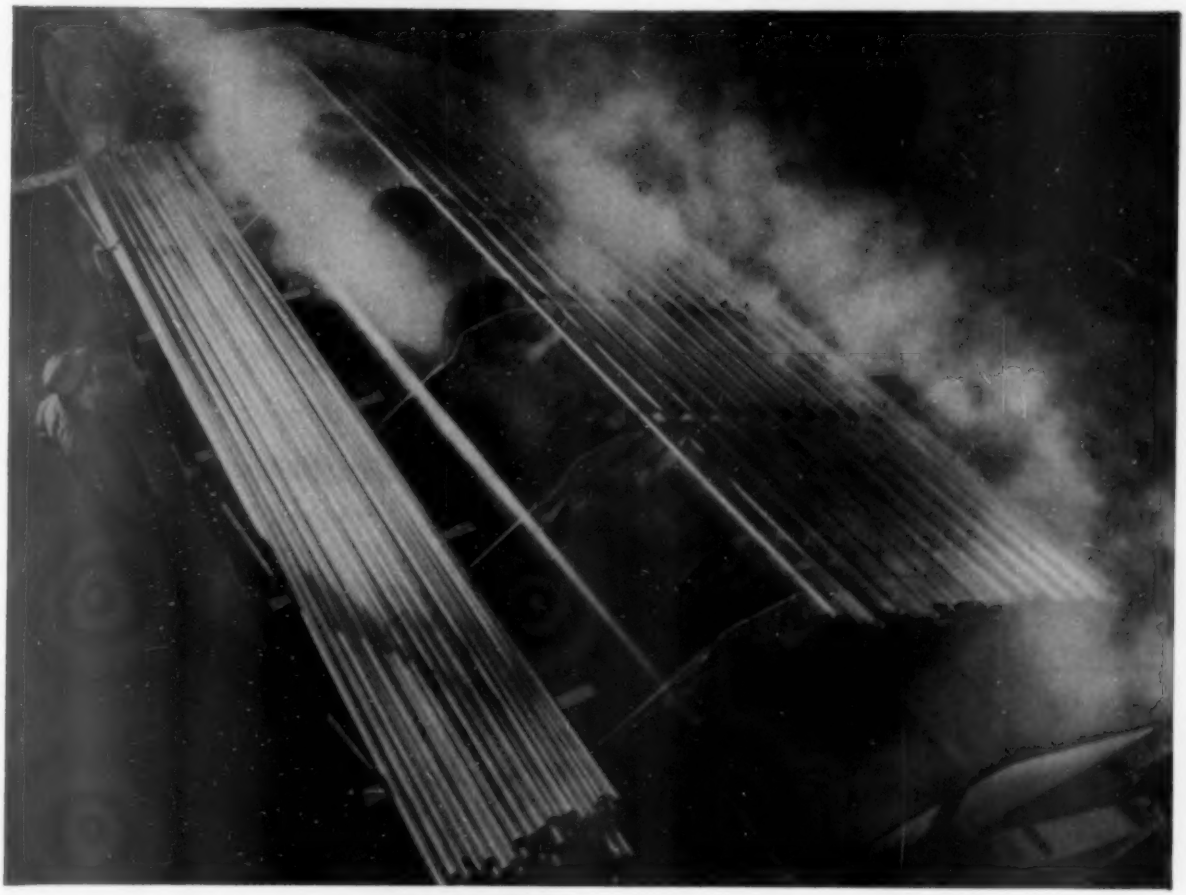
184—Cleaning Compounds. "Plant Maintenance Cleaning Guide" features procedure charts that list recommended cleaner, concentration and temperature, equipment for various jobs. Lists 28 cleaning materials, equipment for applying and handling. 12 pages. *Oakite Products.*

185—Paper Rust Inhibitor. This booklet will show you how to wrap out rust with "Vapor-Wrapper," a chemically active paper that blocks rust in one operation. Application photos show how it protects many types of products and equipment. 16 pages. *Nox-Rust Chemical Corp.*

186—Fire Controls. Four bulletins are offered on control equipment for guarding against flame failure explosions (12 pages), safeguarding your automatic burner (4 pages), a smoke density indicator (4 pages), "Fireye" fire detector (8 pages). *Electronics Corp. of America.*

NOW!

SPANG CW GALVANIZED FINISH IS BETTER THAN EVER!



New quenching facilities at Etna produce improved bonding, longer pipe life for your installations

SPANG takes the lead again in product improvement by the addition of new quenching facilities in the manufacture of galvanized CW Steel Pipe. These facilities handle ½″ to 4″ pipe after it has been galvanized, cooling it in a sodium dichromate solution from 800 F to 160 F under close control.

This careful quenching results in a better bond between the layer of zinc and the steel surface of the pipe, and increases the ductility of the zinc coating.

Here's what it does for you

First, the stronger bond gives you added assurance that the galvanized finish on SPANG CW Pipe will not crack, flake, chip or peel, even under the severest bending strains.

Second, the chemical reaction of the sodium dichromate on the finish retards the formation of white rust on the pipe, an important factor in adding extra service life, especially when ocean shipments are involved. In addition, the galvanized, lustrous finish stays brighter longer.

Add to this all the other *quality-control* features that go into the manufacture of SPANG CW, and you have a *top-quality* product for *top-quality* installations . . . a steel pipe that's clean, uniform, strong, easy to work with.

Take advantage of SPANG's *quality control*. Order SPANG CW Pipe from your nearby SPANG Distributor. He carries the complete line.

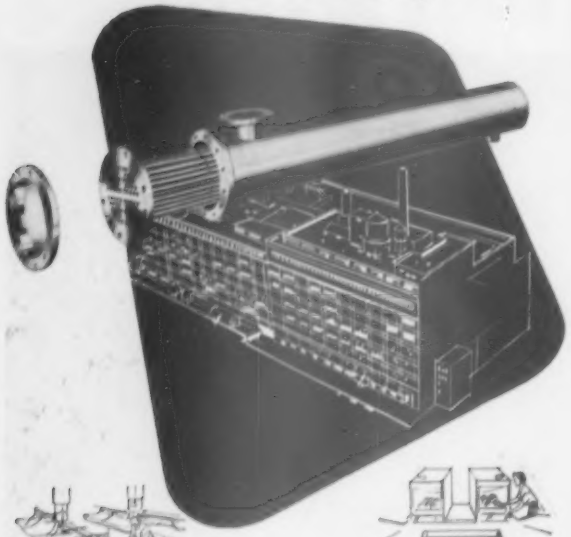
SPANG-CHALFANT

DIVISION OF THE NATIONAL SUPPLY COMPANY

General Sales Office: Two Gateway Center, Pittsburgh, Pa. District Sales Offices: Atlanta, Boston, Detroit, Houston, Los Angeles, New York, Philadelphia, Pittsburgh, St. Louis

SPANG CW STEEL PIPE

How would you heat 100,000 GALLONS of water daily?



Plenty of 140° F hot water is always available at Schrader Valve, supplied by dependable Taco Instantaneous Heaters.

180° F hot water is supplied Schrader's cafeteria where approximately 2,000 employees are served daily.

Here's how Schrader Valve Company does it!

They use 5 Taco Instantaneous Heaters. Every day of the year these 5 Tacos heat 100,000 gallons of water with 5 lb. live steam to 140° or 180°F. All Schrader hot water requirements . . . and there are *many* . . . are amply met by rugged, trouble-free Tacos *without a major repair in 18 years.*

Proof that you can depend on Taco to solve your hot water problem quickly, efficiently and economically. Mail coupon for Simplified Selection Chart today.

TACO HEATERS, INCORPORATED

1160 Cranston Street, Cranston 9, Rhode Island
342 Madison Ave., N.Y. 17, N.Y. • 4 Gilead Place, Toronto 2, Can.

BETTER HEATING — Taco — BETTER WITH TACO

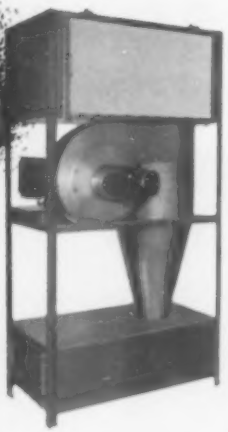
Send Simplified Selection Chart to:

Name .....

Address .....

.....

EFFICIENT–LOW COST Dust Collection



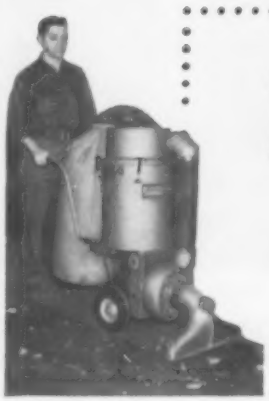
Easy installation . . . efficient low-cost operation . . . simplified maintenance, make Dustkop *FIRST* among equipment to collect most all industrial dusts. There are Dustkop models to eliminate your dust problems . . that are space saving, self-contained units, or exhaust type for rafter, ceiling or outside location. Write for descriptive literature.

DUSTKOP STOPS DUST

37 STANDARD MODELS TO CHOOSE FROM
• READY TO USE

Also a Complete Line of Mist Collectors

AGET MANUFACTURING COMPANY
1410 E. CHURCH ST. • ADRIAN, MICHIGAN



you get **Fast, Dust-Free Floor Cleaning** with **Floormobile**

- suction cleans up to 20,000 sq. ft./hr.
- keeps dust out of the air
- promotes safety
- prevents dust damage
- easy, effortless cleaning
- gas engine powered

Floormobile is a powerful, highly mobile floor cleaning machine that *sucks up dust,* as well as dirt, lint, string, cloth, paper, and other trash. Brooms or mechanical sweepers can't eliminate dust . . . they just stir it up, causing unnecessary cleaning work and damage . . . the cost of which is staggering. Floormobile gives you *dust-free* floor cleaning. Over 250 nationally known companies now have one or more Floormobiles in daily use.

Send for Bulletin #551 giving complete details, including a comparison with other floor cleaning methods.

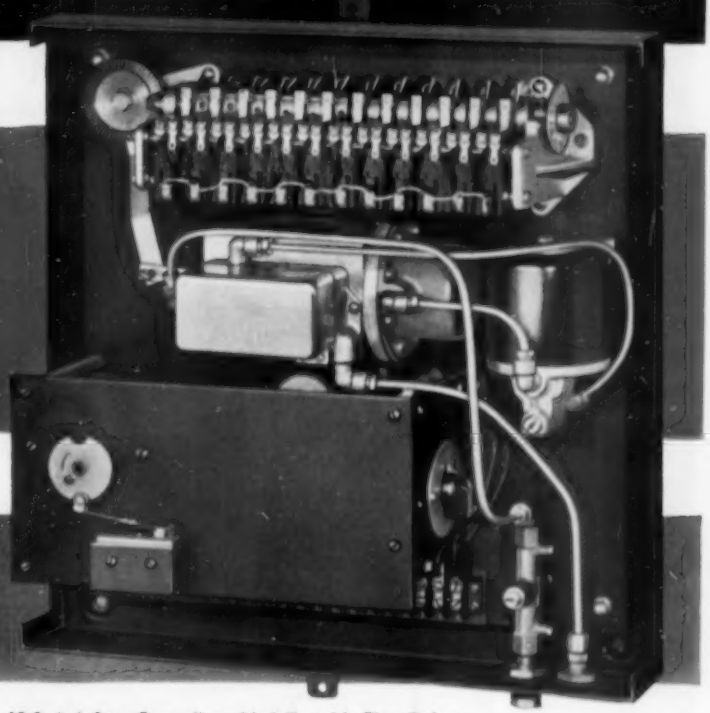
Handling Devices Company, Inc.

Dept. F 43 Pearl St. Brookline 47, Mass.

REFRIGERATION CAPACITY CONTROL

JOHNSON Pneumatic Step Controller

- BALANCES CAPACITY WITH LOAD
- PREVENTS SHORT CYCLING
- EQUALIZES WEAR OF EQUIPMENT



12 Switch Step Controller with Adjustable Time Delay, Recycler Solenoid and Automatic Sequence Changer.

What It Does

This new and improved controller is designed to accomplish, with a single compact unit, everything that is desired for the control of multiple step refrigeration installations, including "on" and "off" operation of the steps in sequence, positive prevention of the starting of more than one compressor at a time after night shutdown or after current failure, and manual or automatic changing of compressor operating sequence to equalize wear. It can be used to control one or a group of refrigeration machines. It completely eliminates all the disadvantages of a series of separate pressure switches.

How It Works

The Johnson Pneumatic Step Controller, in response to changes in pressure from a controlling thermostat, actuates a number of separately adjustable, snap-acting, single-pole, double-throw switches in any desired sequence. Control arrangements include (1) starting and stopping two or more compressors in sequence, (2) operation of cylinder unloaders in sequence, or (3) a combination of (1) and (2).

Special Features

Recycler and Time Delay—Recycler Solenoid immediately returns all switches to their normal position on shutdown or current failure. Time Delay assures the proper interval between successive switch operations on start-up or when current is restored after failure.

Sequence Changer—Varies the starting sequence of compressors to equalize running time and wear. Step Controllers are furnished with either Manual or Automatic Sequence Changer.

Models—Choice of 4, 6, 8 and 12 switch units, with or without special features such as Recycler, Adjustable Time Delay and Sequence Changer.

* * *

Installation and operation of the Johnson Pneumatic Step Controller is both simple and inexpensive. A nearby Johnson engineer will gladly explain, without obligation, how it can best solve your special problems, or write today for full details.

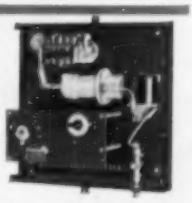
JOHNSON CONTROL

SINCE 1885

PLANNING • MANUFACTURING • INSTALLING

OTHER APPLICATIONS

Johnson Step Controllers are also used to control multiple fan or pump installations, electric heaters and other systems where electrically actuated devices are to be operated in sequence from a proportional acting pneumatic controller. Send the coupon for more facts.



JOHNSON SERVICE COMPANY

507-P **East Michigan St., Milwaukee 1, Wis.**

Please send me Apparatus Bulletin G-180 describing specifications, features and application of Johnson Pneumatic Step Controllers.

NAME_____

FIRM_____

ADDRESS_____

CITY & STATE_____

Research is the Key

Valdura *guarantees* you the lowest cost per job with any one of the famous Valdura Maintenance Paint products. The key to this guarantee is exhaustive Valdura *research*—in laboratories which are acclaimed to be the industry's finest!

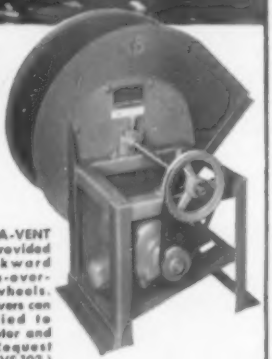
All Valdura products are SPECIFICS—specially formulated to give you *not* the lowest cost per gallon, but the *lowest cost per job* based on performance, long life, and saving of labor.

If you'd like help with a particular problem, just send us an inquiry on your letterhead. Be sure to ask for complete information on Valdura's complete line of specialized maintenance products. *Your inquiry will be treated as an invitation to provide service . . . not as a license to exert selling pressure!*

VALDURA
PAINTS THAT ENDURE

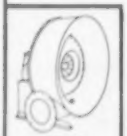
VALDURA HEAVY DUTY PAINT DIVISION
AMERICAN-MARIETTA COMPANY
101 E. Ontario St., Chicago 11, Ill.

Another Story Illustrates GENERAL BLOWER FLEXIBILITY!



G-B UTIL-A-VENT units are provided with backward blade non-overloading wheels. Weather covers can be supplied to protect motor and drives. (Request Bulletin (UVS 103.)

This is why UTIL-A-VENT blowers and flexibility mean the same thing.



TURBO

STEEL PLATE

CENTRIFUGAL FANS BACKWARD BLADE FORWARD CURVE

GENERAL BLOWERS ARE CUSTOM ENGINEERED

When it was decided to add another story to the building shown above, the G-B UTIL-A-VENT blowers were removed, placed on the new roof; additional ducting was added. Fan speed was simply increased to exhaust the required amount of air. With this backward blade non-overloading type G-B unit, adjustable drives are supplied to permit increasing or reducing fan R.P.M.

Why not let GENERAL BLOWER engineering and manufacturing skill solve your next air movement problem? There is a GENERAL representative in your area.

AMERICA BREATHES EASIER
"Lungs for Industry"

Over 20 years of engineering and manufacturing experience

GENERAL BLOWER COMPANY
8609 FERRIS AVE., MORTON GROVE, ILL.

Dispensed from "throw-away" container – no costly maintenance. One "C-60" dispenser replaces from 3 to 6 conventional soap dispensers.

DRAMATIC "UPSIDE-DOWN HAND TEST" PROVES SBS-60 IS ALMOST

IMPOSSIBLE TO WASTE!

SBS-60

CREAM DEODORANT SOAP

Saves up to 50% on soap costs

The above photograph PROVES that no other soap can match the REAL ECONOMY of SBS-60 Cream Deodorant Soap.

SBS-60 is a white, opaque, thick-bodied cream that is economically dispensed . . . and for all practical purposes, is impossible to waste! It is an entirely *new type* of skin cleanser heralded as the first major soap development in a quarter of a century.

No matter how efficient your present skin cleansers . . . SBS-60 Cream Deodorant Soap can bring you savings up to 50%. There are the *facts*. Get complete, detailed "question and answer" literature and learn the whole exciting story. Mail the coupon *now*.

SBS research developed SBS-60 after years of study. This new type of soap is proclaimed the successor to liquid and bar soaps.

SBS

Sugar Beet Products Co.
Chemical By-Products Division
302 Waller St., Saginaw, Mich.

Canadian Subsidiary
Chemical By-Products, Ltd.
8 Ripley Ave., Toronto 3, Canada

SUGAR BEET PRODUCTS CO.
302 Waller St., Saginaw 62, Mich.

GENTLEMEN:

Send detailed "question and answer" literature on SBS-60 Cream Deodorant Soap.

NAME_____

TITLE_____

COMPANY_____

ADDRESS_____

CITY_____ ZONE____ STATE_____

Bendix-Friez

AEROVANE* SYSTEM

TRANSMITTER

RECORDER

INDICATOR

CONTROLLER (Windtrol†)

...helps solve air pollution problems

Chances are, the Bendix-Friez* Aerovane System can be a big help to you in offsetting air pollution problems. For example, if wind speed and direction are an important factor in your problem, here's one way the Aerovane System can help. When wind speed reaches a pre-set value and wind direction falls within an undesirable sector, the Aerovane controller will automatically actuate operating equipment such as fans, blowers, heaters, etc. The entire system can be used in dozens of plant applications. Or, any one of the units can be purchased for use with the transmitter.

TRANSMITTER—Detects wind speed and direction. Electrically sends information to indicator, recorder and controller.

RECORDER—Inks the wind speed and direction on time calibrated chart. Has three speeds for 1½-, 3- or 6-inches per hour. Under normal 3-inch-per-hour setting, recorder operates continuously for two-week period.

INDICATOR—Shows wind speed and direction. Illuminated dials, white over black markings for maximum legibility. Calibrated in degrees of compass and miles per hour.

CONTROLLER—Actuates circuits, turns on alarm system, operates other equipment when wind speed and direction reach pre-determined settings. Wind speed and wind direction dials mounted on face. Automatic time delay device compensates for fluctuating wind direction and speed. Time length is adjustable.

Write today for complete information. *Reg. U. S. Pat. Off. †Trade-mark

Bendix - Friez

FRIEZ INSTRUMENT DIVISION • BENDIX AVIATION CORPORATION

1459 TAYLOR AVENUE BALTIMORE 4, MARYLAND

Export Sales and Service: Bendix International Division, 205 E. 42nd Street, New York 17, N. Y., U.S.A.

FACTORY | EQUIPMENT REVIEW . . .

. . . of selected items announced over the past twelve months in FACTORY's "Equipment News" section.

1—Suspended Water Cooler provides clearance for floor cleaning. Protects cooler from harmful acids and chemicals that come in contact with floor; solves problem of pipes, other obstructions on floor level. And its position provides a more comfortable drinking level. *Cordley & Hayes.*

2—Wall Panel can be field-assembled with minimum tools and labor. Components can be shipped to job site, where panel can be fabricated and erected. Can be disassembled and reused. Insulating value is equal to 16-in. masonry wall. *Detroit Steel Products Co.*

3—Packaged Boiler preheats incoming water for processing. Recapturing this heat, which might be lost to atmosphere, saves on steam and fuel costs. Also reheats condensate, plus make-up water, to near steaming temperature; returns it to boiler. *Patterson-Kelley Co.*

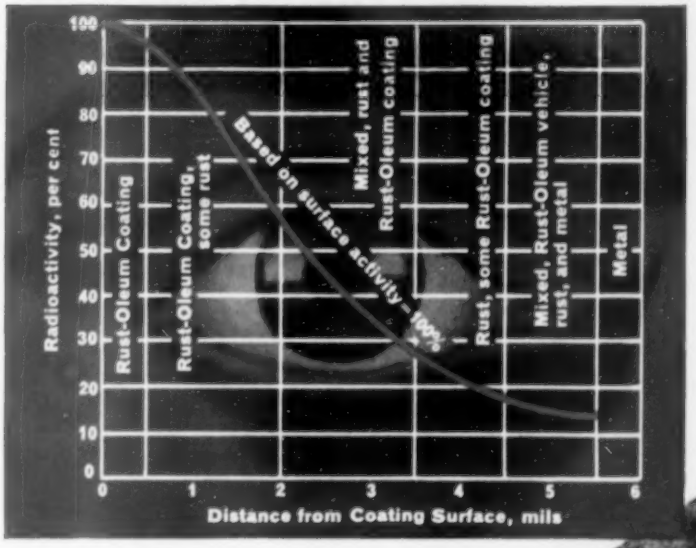
4—Refrigerant Condenser, evaporative-type, has sections encased in separately removable panels. Allows complete accessibility for painting or cleaning of coils from any side; shipment of casing at flat panels, rather than box shapes. 90-240 tons. *Niagara Blower Co.*

5—Plug-In Strip, besides providing electrical outlets, has integral raceways for branch circuit conductors. Branch circuits for 100- and 200-volt service can be run in same duct with strip harness. *National Electric Products Corp.*

6—"Snap-On-Walls" are possible with use of five extruded aluminum channels—inside and outside corners, edging, firing, snap-on members. Perforated hardboard or met-

To get these catalogs, circle item numbers on the Reader Service card next to back cover.

See Rust-Oleum *penetrate rust* to bare metal through the "Eyes" of Radioactivity!



Curved line illustrates Rust-Oleum penetration through rust at each mil level as recorded by Geiger Counter.

Rust-Oleum dries to a firm, decorative coating that resists salt water, sun, fumes, heat, humidity, and weathering.

Geiger Counter traces Rust-Oleum penetration to bare metal! In nearly three years of radioactive research, Rust-Oleum's *specially-processed* fish oil vehicle was radio-activated and formulated into Rust-Oleum 769 Damp-Proof Red Primer – then applied to rusted test panels. Rust-Oleum's specially-processed fish oil vehicle was then traced through the rust to bare metal by Geiger Counter.

This penetration means rust-stopping power, because the fish oil vehicle works its way into the tiny pits in the metal where it drives out air and moisture that cause rust. Important savings are yours, because Rust-Oleum can be applied directly over sound rusted surfaces – usually eliminating costly surface preparations. Attach coupon to your business letterhead for your copy of the thirty-page report entitled, "The Development of a Method To Determine The Degree of Penetration of a Rust-Oleum Fish-Oil-Based Coating Into Rust On Steel Specimens," prepared by Battelle Memorial Institute technologists. Prompt delivery of Rust-Oleum is assured from your nearby industrial distributor.

There is only one Rust-Oleum. It is distinctive as your own fingerprint.

RUST-OLEUM®

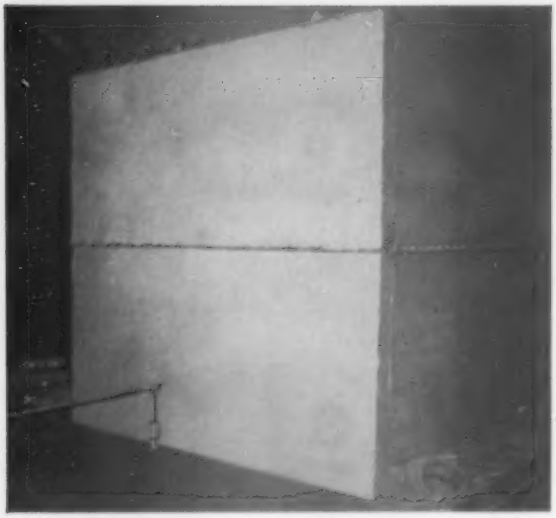
STOPS RUST!

Rust-Oleum is available in practically all colors, including aluminum and white. See our complete catalog in Sweets, or write for information.

ATTACH TO YOUR LETTERHEAD—MAIL TODAY!

Rust-Oleum Corporation
2453 Oakton Street
Evanston, Ill.

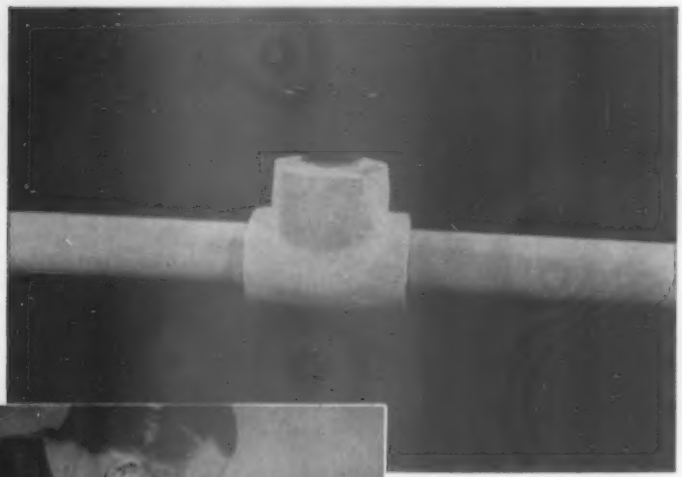
- ☐ Complete literature with color charts.
- ☐ Thirty-page report on Rust-Oleum penetration.
- ☐ Nearest source of supply.



Large, flat areas are quickly insulated with B-H Super Powerhouse Cement.

BALDWIN-HILL *Super* POWERHOUSE CEMENT.....

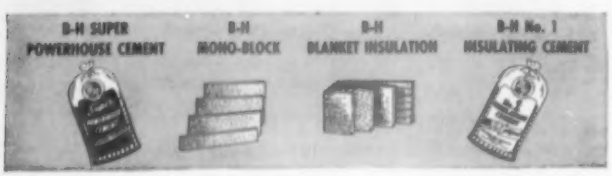
NOW IS.... WHITE



B-H Super Powerhouse Cement trowels easily and sets quickly to form a smooth, white, glazed surface to conform to surrounding pipe covering.

Where adjacent pipe covering is painted, B-H Super Powerhouse Cement readily takes application of either water-base or oil-base paints.

Made from the NEW Baldwin-Hill Spun Mineral Wool fibers, Super Powerhouse Cement dries out *white* to give you a better, more pleasing finish coat. And remember, it requires only one-coat application because it *insulates* as it *finishes.*



BALDWIN-HILL COMPANY

504 Breunig Ave. Trenton 2, N. J.

Kalamazoo, Mich. Huntington, Ind. Temple, Texas

For more about these products, circle item numbers on Reader Service card next to back cover.

al panels are simply inserted into snap-on member and clicked into place. *Aluminum Co. of America.*

7—Window admits light while controlling heat and glare. One-piece louvered panel of molded Plexiglas resembles washboard. Each louver combines clear with opaque surface. Admits light only, but may be combined with other frames for ventilation. *Luria-Courand, Inc.*

8—Lubrication Spray Panels for gears are fastened to housing or framework. Apply lubricant directly to pressure side of teeth in penetrating spray. Lubricant is delivered at regular intervals from central station serving up to three or more panels. *Farval Corp.*

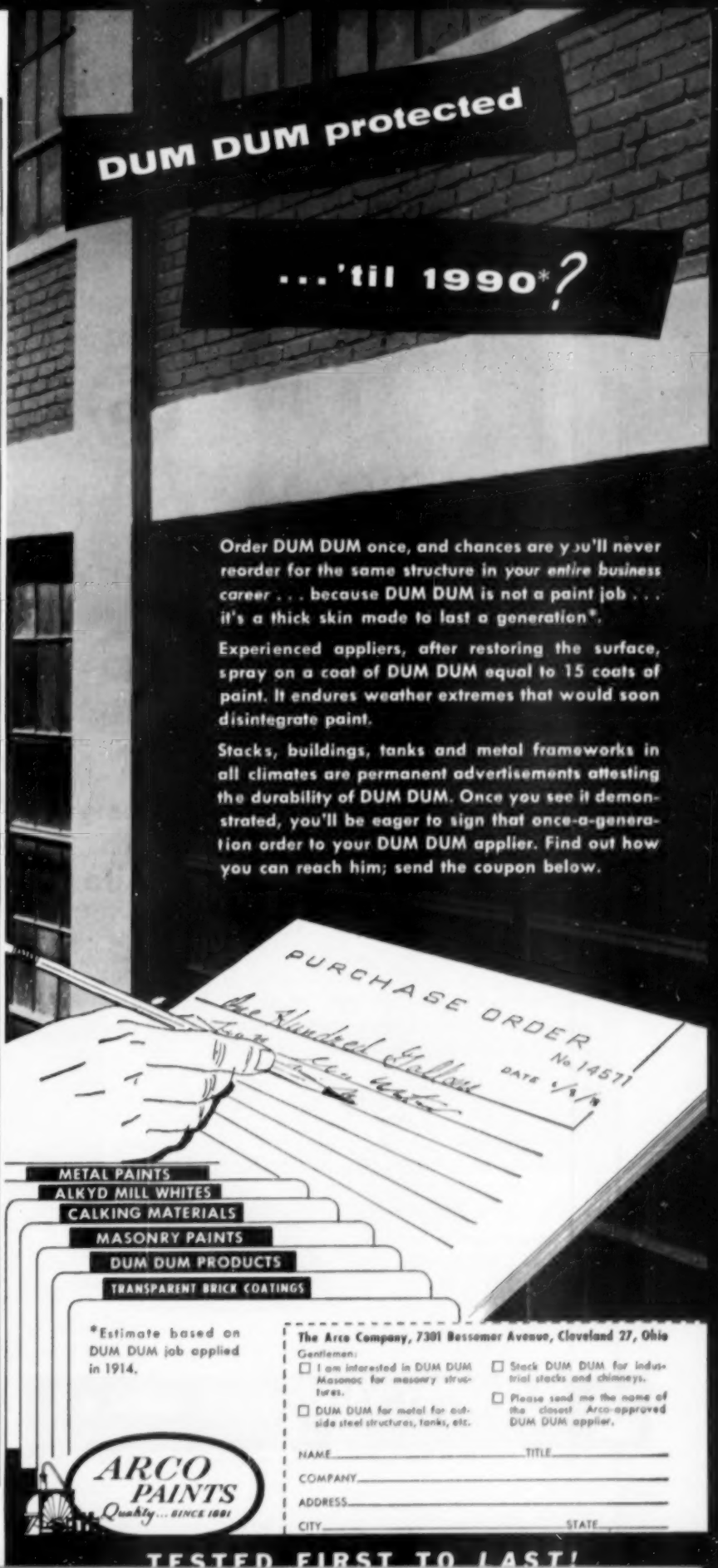
9—Electronic Humidity Controller automatically operates large or small humidifiers, dehumidifiers, air conditioners; maintains control within plus or minus 1.25% relative humidity. "Humistat" is easy to wire and set; needs no recalibration. *American Instrument Co.*

10—Burner Control System is for oil, gas, combination oil/gas burners. "Fireye AC" combines in one panel flame failure safe-guard, programming control, short-circuit protection, motor starters, fuel selector switches, signals, alarms. *Electronics Corp. of America.*

11—Fluomeric Lamps produce natural, sunlike glow, are bright enough for high bay installations, or wherever good lighting is needed. Combine yellow-red tone of incandescents and blue-green hue of mercury vapors with flexibility of fluorescent phosphors. *Duro-Test Corp.*

12—Electrical Tape, pressure-sensitive aluminum foil, creates moisture vapor barrier in communication cable splices. For plastic-insulated, plastic-sheathed cable splices, and where they're spliced to paper-insulated, lead-sheathed cable. *Minnesota Mining & Mfg. Co.*

Turn the page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...'til 1990*?
Order DUM DUM once, and chances are you'll never reorder for the same structure in your entire business career . . . because DUM DUM is not a paint job . . . it's a thick skin made to last a generation*.
Experienced appliers, after restoring the surface, spray on a coat of DUM DUM equal to 15 coats of paint. It endures weather extremes that would soon disintegrate paint.
Stacks, buildings, tanks and metal frameworks in all climates are permanent advertisements attesting the durability of DUM DUM. Once you see it demonstrated, you'll be eager to sign that once-a-generation order to your DUM DUM applier. Find out how you can reach him; send the coupon below.
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METAL PAINTS
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*Estimate based on DUM DUM job applied in 1914.
The Arco Company, 7301 Bessemer Avenue, Cleveland 27, Ohio
Gentlemen:
I am interested in DUM DUM Masonac for masonry structures.
DUM DUM for metal for outside steel structures, tanks, etc.
Stack DUM DUM for industrial stacks and chimneys.
Please send me the name of the closest Arco-approved DUM DUM applier.
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Quality... SINCE 1881
TESTED FIRST TO LAST!

KENNEDY presents the *NEW* Look in Bronze Gate Valves

Fig. 427
Standard 125-lb. S.W.P. Bronze Gate, Non-Rising Stem, Inside Screw, Wedge Disc, Screwed Ends.

Fig. 427BS
Standard 125-lb. S.W.P. Bronze Gate, Non-Rising Stem, Inside Screw, Wedge Disc, Brazing Socket Ends.

Fig. 427SJ
Standard 125-lb. S.W.P. Bronze Gate, Non-Rising Stem, Inside Screw, Wedge Disc, Solder Joint Ends.

KENNEDY'S *NEW* Cylindrical Design Means Greater Body Strength, Far Longer Leakproof Valve Life!

RUGGED BODY DESIGN . . . assures superior resistance to distortion as proven in high pressure steel valve design; Kennedy's grueling Accelerated-Wear tests conclusively prove this construction guarantees more than 10 times longer leakproof operating life than oval-body valves. Increased weight assures greater durability and longer valve life.

KENALLOY STEM . . . a special Kennedy stem material of silicon bronze with high tensile strength, accurately machined for ease of operation. The bronze alloy prevents seizing or galling and is entirely free from any tendency to dezincify.

PISTOL-GRIP HANDWHEEL . . . non-heating malleable iron, provides firm, easy three-way grip on top, sides and bottom. Indented rim notches top, side and bottom eliminate slip even with greasy gloves.

• *Write today for complete details. Ask for Circular*

THE KENNEDY VALVE MFG. CO. • ELMIRA, N. Y.
VALVES • PIPE FITTINGS • FIRE HYDRANTS

OFFICE AND WAREHOUSES IN NEW YORK CHICAGO SAN FRANCISCO ATLANTA SALES REPRESENTATIVES IN PRINCIPAL CITIES.

FACTORY / EQUIPMENT REVIEW
Begins on page D-80

For more about these products, circle item numbers on Reader Service card next to back cover.

13—Centrifugal Water Chillers, CenTraVac line, for outdoor installation without protective enclosure. Hermetic construction and automatic operation, plus weatherproofing features, make them suitable for outdoor use. *Trane Co.*

14—Roof Deck has UL approval of one-hour fire rating. Made of corrugated steel, layer of concrete mixed with volcanic rock aggregate, topped with asphalt. Deck was tested with under side of corrugated metal exposed directly to flames. *Perlite Institute.*

15—Table-Bench Unit has two tables, four benches, that fold in center, lock vertically into all-steel, caster-equipped carrier. "Mobil-Fold" provides lunch-hour seating, using minimum floor space. Folds to 6 ft. high. Seats 32 adults. *Schieber Sales Co.*

16—Ultrasonic Alarm System provides network of protection for entire premises against intrusion at night. Designed for use with burglar and police-alarm systems, but can be tuned down for localized protection. Even detects air turbulence caused by fire. *Diebold, Inc.*

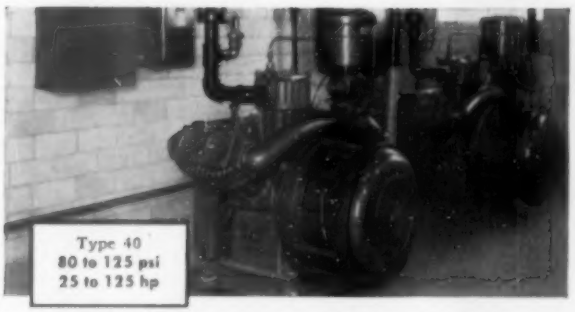
17—Plug-In Panelboard features breakers with right-angle "Swingrip" mounting. Assures proper positioning; firm, positive connection in one easy, natural operation. For a-c lighting, appliance branch circuits. With main lugs only, or main breaker. *Square D Co.*

18—Portable Dust Collector is ideal for small installations or isolated machines. Centrifugal separation minimizes load to standard "throw-away" filter. Heavier particles are deposited in drawer in base for quick disposal. 400-1000 cfm. *Schmieg Industries, Inc.*

19—Heavy-Duty Relays, 10-amp., feature sectional pole design. Poles are individually removable and replaceable without disturbing other

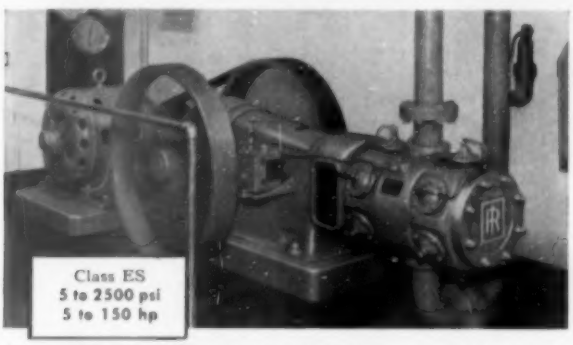
Turn to page D-90

You can always depend on I-R compressors for real economy



Type 40
80 to 125 psi
25 to 125 hp

High-capacity, two-stage compressors with air-cooled cylinders and intercoolers, available with three types of electric motor drive: V-belt, flexible coupling and unit type with compressor and motor on common shaft. All units are highly efficient, compact and light in weight.



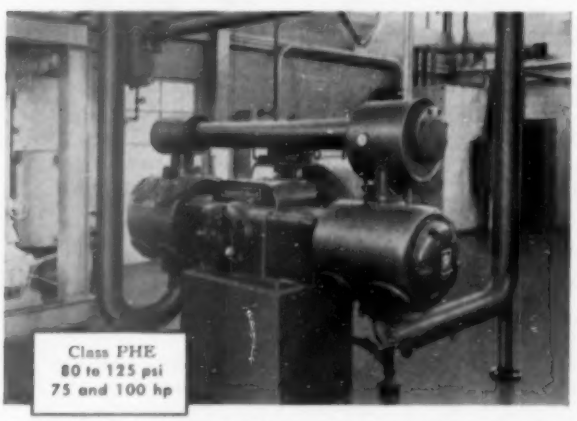
Class ES
5 to 2500 psi
5 to 150 hp

Heavy-duty units with one, two and three stages—arranged for electric motor or steam drive. These double-acting, horizontal, crosshead-type compressors, with Channel Valves and water-cooled cylinders, are built for continuous full-load service under severe operating conditions.

- *Efficient operation*
- *Low maintenance costs*
- *Easy installation*

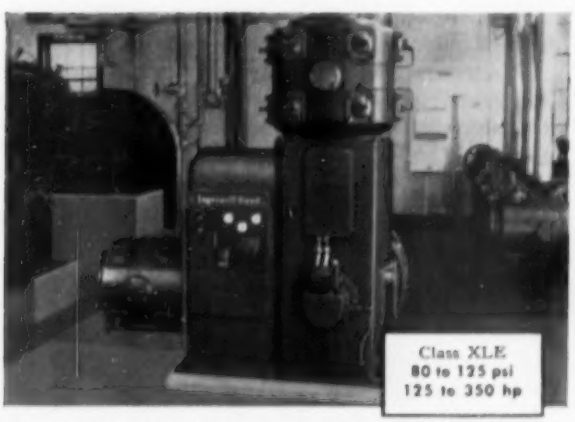
Whatever your compressed air requirements, there's an Ingersoll-Rand compressor that's *right* for the job. Because mechanical and compression efficiencies are high, the unit will deliver full rated output with consistently low power requirements. With its rugged, dependable construction, the I-R compressor will stay on the job longer, with less time out for maintenance.

You can be sure of receiving real economy from *any* Ingersoll-Rand compressor . . . a machine that is economical to install, run and maintain. Contact your nearest I-R branch for complete information.



Class PHE
80 to 125 psi
75 and 100 hp

Opposed-cylinder, balanced-design, two-stage compressors with water-cooled cylinders and built-in motor. There are no adjustments within the sealed frame. Full-floating aluminum bearings have extremely long life. Channel Valves are highly efficient. A completely packaged unit.



Class XLE
80 to 125 psi
125 to 350 hp

Heavy-duty, double-acting, two-stage, water-cooled compressors, featuring a completely new "L" design which makes the XLE simple, compact, accessible and economical. Pipeless, Thru-Frame Air Flow. Packaged intercooler and built-in electric motor save space—reduce installation, power and maintenance costs.

Only I-R compressors have CHANNEL VALVES

Known for high efficiency, quiet operation and exceptional durability. Entirely different. Each valve assembly is a combination of rigid stainless-steel channels and springs, with trapped-air spaces which cushion action.

OTHER TYPES AND SIZES . . . TO 6000 HP

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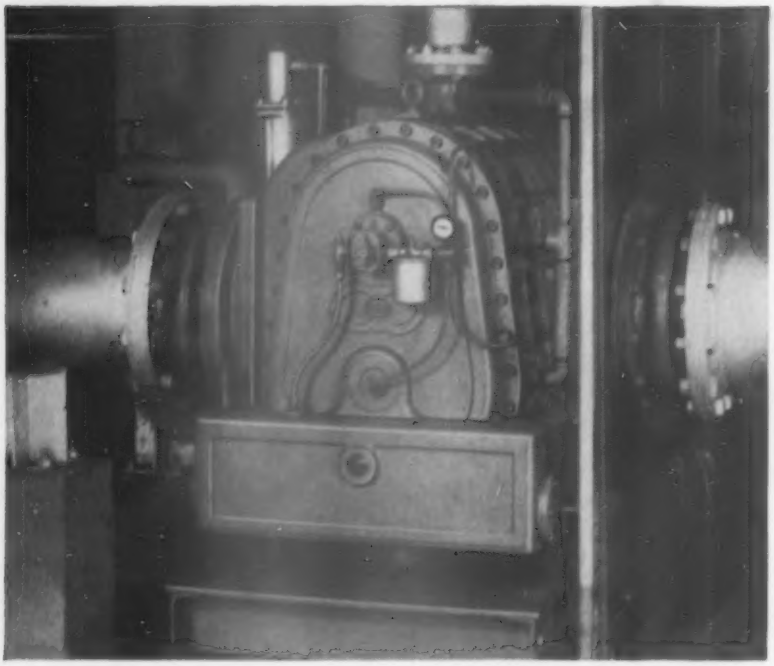
To the 10 plants receiving Factory's "Most Significant Plant" awards use Ingersoll-Rand Air Power



4 years of gruelling operation frequently at overload pressures and still no maintenance needed

Since 1951, Standardaire Blowers installed at Spencer Chemical Company have been operating 24 hours a day supplying process air for production of synthetic ammonia.

Although normally operated at 1750 rpm and 8 psig, these units periodically are required to run at more than 50 percent above rated capacity for as long as a month at a time. When brick and catalyst dust seal over reformer catalyst beds, this pressure is needed to force the gases through and avoid costly shutdowns.

After four years of this gruelling, continuous operation, a recent test disclosed virtually no reduction in efficiency of the Standardaire Blowers. They have required no maintenance.

Exclusive cycloidal design and simple, compact construction enable Standardaire Blowers to move more gas or air per pound of blower, with less wear, less maintenance and power consumption. Write for complete information.

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give your clients this **Flexibility** in **AUDIBLE SIGNALS**

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12 different sound instruments all fit one adapter plate

Businesses change. Noise levels go up and down. Uni-Pact signal systems let you provide for these changes . . . in advance! "Quick change" horns, buzzers, bells, chimes — from 75 to 100 decibels Nema Standard at 10 feet — all plug into one standard adapter plate. Safer too. No exposed terminals in dead-front adapter plate. Plan flexibility. Specify Faraday signal systems. And rely on Sperti Faraday for the best in:

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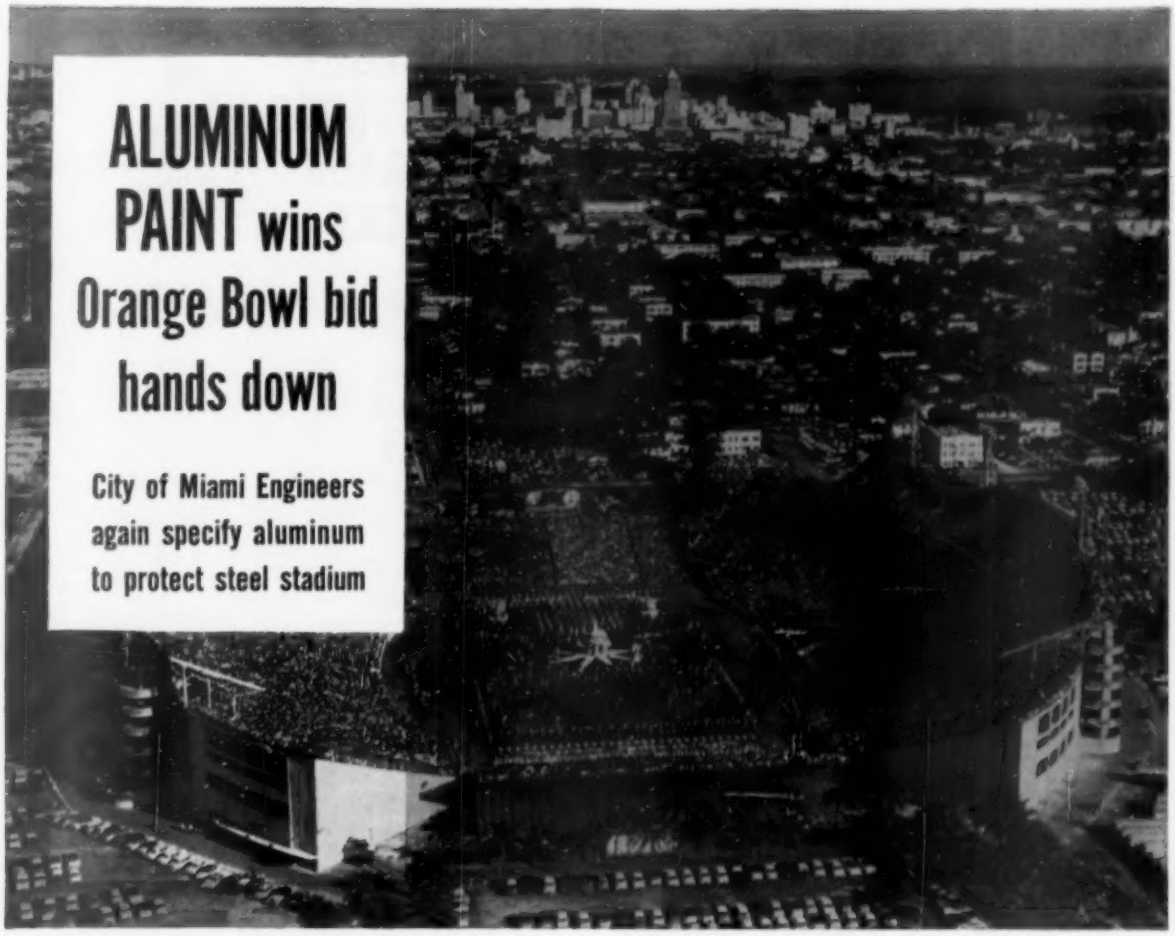

ALUMINUM PAINT wins Orange Bowl bid hands down

City of Miami Engineers again specify aluminum to protect steel stadium

The world-famous Orange Bowl at Miami, Florida, was recently enlarged for the fourth time. Aluminum Paint as manufactured by **Gable Tite Products Company, Inc.**, Miami, and applied by V. J. Haecherl Painting Co., contractor, was used for the new addition.

It takes a star performer with a proven record to be invited to the Orange Bowl. But here's a *real* performance and a *real* record. Aluminum paint has been "invited back" *every season* for many years. The Department of Engineering of the City of Miami specifies aluminum paint because:

"When properly applied, aluminum paint offers excellent protection against the atmospheric conditions found in South Florida. For this reason aluminum paint was specified for the finish coating of all steel members in the 4th addition of the Orange Bowl Stadium. Aluminum paint has been used on the Orange Bowl for many years."

Aluminum paint's outstanding record on the Orange Bowl should suggest some applications in *your* business . . . point the way to painting economies you should be making. A paint that can withstand the salty, moist sea air and the blazing sun of Florida—and look beautiful along with it—could be just the paint for your plant.

ALCOA does not make paint . . . but ALCOA Aluminum Pigments are used in more aluminum paints than any other brand. ALCOA's cooperation with paint manufacturers has made possible many special formulas designed to solve your toughest problems. Aluminum paint offers the utmost in brightness and protection.

Write today for more information on all types of aluminum paints. Use the coupon.

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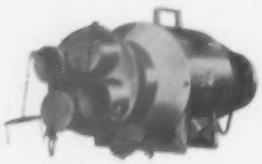
TYPE PLF
Heavy duty "Power Line" exhaust fans move huge volumes of air for general ventilation—removal of fumes, steam, smoke.



TYPE OPJ
Ventilates up to four remote or separated spaces at same time. The powerful, portable unit for a variety of 'spot' applications.

LET Chelsea SHOW YOU HOW...

Planned Ventilation

WILL PERMIT INCREASED PLANT USAGE

Unused factory areas can be converted to profitable production space — even when smoke, fumes or heat are produced — with planned ventilation. Chelsea engineers will recommend practical and economical ways to improve or expand your present ventilating system — to permit increased plant use or improve individual production. Call on Chelsea today, to solve any ventilating problem.

TYPE PLDX
Non-overloading Duct Booster fans increase the effectiveness of long ducts—entire ventilating system. Ideal for use under static pressure.

TYPE PH and PHD Units
Efficient, assembled package unit. Interior sprayed with sound deadener. Direct or belt driven fan. Ball bearing motor.

CHELSEA
FAN & BLOWER CO., INC.
PLAINFIELD, NEW JERSEY
1926-1956 — More than 30 years service to the ventilating industry

STURDI-BILT
ADJUSTABLE STORAGE RACKS

ONLY 3 BASIC PARTS

1 Sturdi-Bilt's exclusive Floating Wedge Lock 2 inserted in the upright frame 3 and joined to the support beams

Make any type rack for
PALLETS • BULK • SKIDS • DIES

VERSATILE! FLEXIBLE! ECONOMICAL!

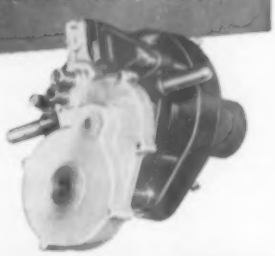
One rack to serve all your needs! Handle all types of storage *interchangeably* at any time! No tools, nuts, bolts, erection welding or special labor to assemble, rearrange or adapt to changing needs. Available in one or two pallet width openings — heights to fit your needs — and they *stack* for added utility.

Sturdi-Bilt ENGINEERING CO. INC. Dept. FMM-4
2501 Peterson Ave., Chicago 45, Ill.

NEW PORTABLE POWER UNIT!

SPEEDS PIPE THREADING

Powers all standard dies —threads up to 6" pipe or conduit in any position —pulls wire, powers winches, hoists, etc.



PORTA-Drive Reversible Power Unit

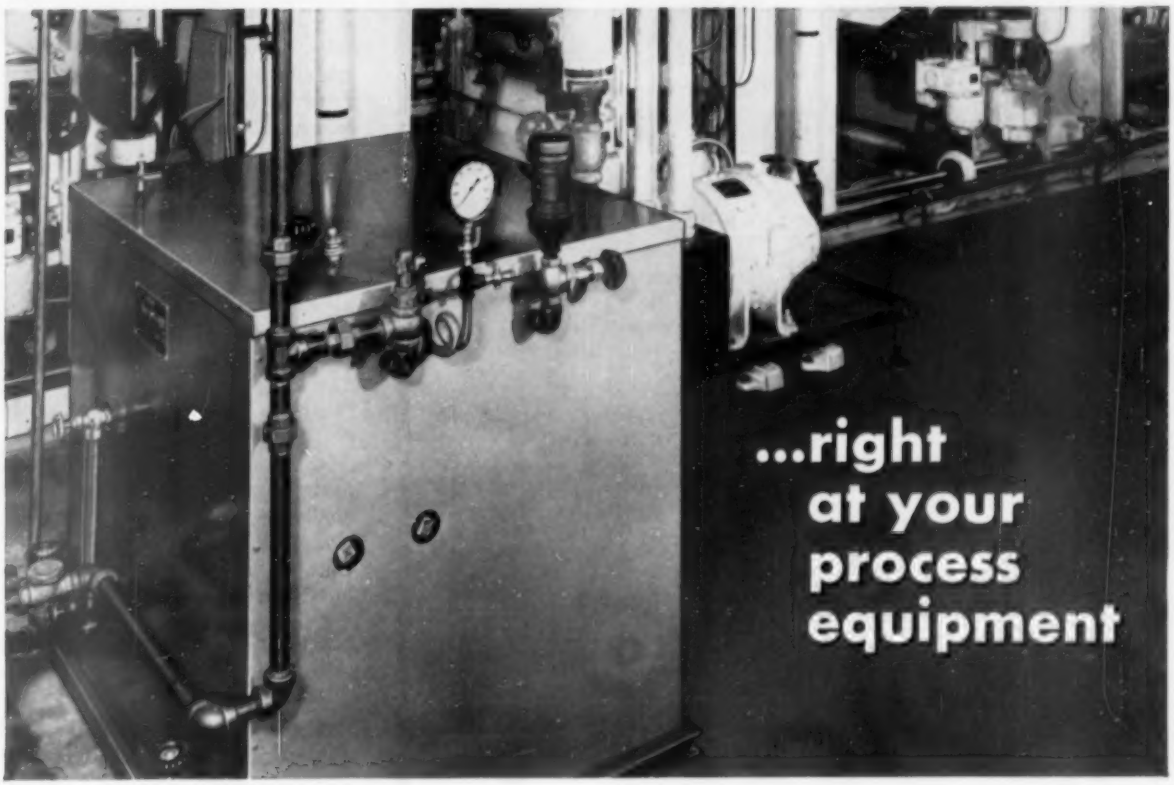
Every Plumber, Electrician and Maintenance Department Needs This Tool!

PORTA-DRIVE is a powerful, 20 to 1 ratio, gear drive unit designed to drive all standard geared pipe threaders. Powered by ½ inch electric or air drill, PORTA-Drive threads pipe 2 to 3 times faster than older methods, with much less labor. Fourteen-pound PORTA-Drive replaces larger, more complicated machinery in the shop . . . yet rides comfortably in an ordinary tool kit to mechanize the outside work. Simple and quick to set up and use, PORTA-Drive gets in to do the work in close quarters where other methods couldn't work. Thousands sold—wihtout a single complaint. Your jobber can supply you. **Write for literature.**

MUNCIE GEAR WORKS, INC. Muncie, Indiana

for as little as $685

you can have high pressure steam



with a Pantex Speedylectric Steam Generator

Think of it! — Speedylectric lets you have constant temperature "dry" steam wherever you want it for as little as $685. Install it near your platen presses, or for degreasing, and phosphatizing, or on jobs that are remote from your central boiler. No fumes, no flame, no smoke-stacks or other complicated installation problems. Just plug in to either 220, 440 or 550v outlet, connect piping, and you have an ever-ready source of high pressure steam that you can control precisely.

Speedylectric utilizes the electrode principle — the simplest, lowest cost method for generating steam electrically. It has no coils, tubes or electric elements to scale and burn out. No feed water treatment or daily blow-down is needed. Equally important, Speedylectric is safe from fire dangers . . . no open flame or low water explosion hazards. (Underwriter's Laboratories Listing) 1 to 60 Bhp; 15 to 500 Psi. Why not write for complete data and illustrated Bulletin.

Speedylectric Steam-Jet Cleaner lets one man do the work of five. High pressure jet of dry steam and solvents quickly removes grease and dirt accumulations from machines and equipment *without* flooding floors. No need to stop nearby production or move machines outside. Completely safe and portable.

Pantex Manufacturing Corporation
Box 660H Pawtucket, R. I.
Send me complete illustrated data on:
☐ Pantex Speedylectric Steam Generators.
☐ Pantex Speedylectric Steam-Jet Cleaners.

NAME AND TITLE _____
COMPANY _____
ADDRESS _____

Industrial Ventilation Is Our Business!
. . . and we've over 400 varied fans and blowers in our line to prove it. Peerless Fans and Blowers are built completely by Peerless . . . motors and all. We guarantee them — unconditionally. They're designed for low initial cost and continuous, trouble-free performance. Each unit is built to PFMA, NEMA or NAFM standards. We're used to engineering, designing and building to customer or government specifications. Your nearby Peerless representative has all the information about the complete line of Peerless industrial air-moving products. Consult him, or write, wire or call us today.
Send for Bulletins SDA-160 and SDA-200!
FAN AND BLOWER DIVISION
THE Peerless-Electric® COMPANY
FANS • BLOWERS • ELECTRIC MOTORS • ELECTRONIC EQUIPMENT
WARREN, OHIO

FACTORY / EQUIPMENT REVIEW
Begins on page D-80

To get these catalogs, circle item numbers on the Reader Service card next to back cover.

poles or wiring. Type PM relays made with 2-12 poles. Relays to 8 poles available without double-decking. *Clark Controller Co.*

20—Packaged Water Coolers for air conditioning and process refrigeration are factory-assembled; installed with a few simple water and electrical connections. 12 models, 5-125 hp. 25- to 75-hp. sizes small enough to pass through average size doorway. *Carrier Corp.*

21—Gate Valve has a renewable seat ring that can be replaced while valve remains installed in the line. Takes about 10 minutes, under all conditions, with a screwdriver only. Just disassemble bonnet; unscrew rings, lift out; slip in new rings, secure. *Fairbanks Co.*

22—Plastic Coated Cable resists sunlight, oxidation; most acids, bases, salts, oils, greases. "Plasteel" is made of galvanized or stainless steel wire rope coated with tough, flexible plastic. Sizes (with coating), ⅛-⅜ in.; strengths, 480-7000 lb. *Macwhyte Co.*

23—Acoustical Baffle reflects noise to 60%. Lightweight, wedge-shaped units are made of glass fibers bonded with thermosetting resin. Easily installed — low to trap noise near source; high to catch reflected sound. Foil-faced or plain. *L.O.F. Glass Fibers Co.*

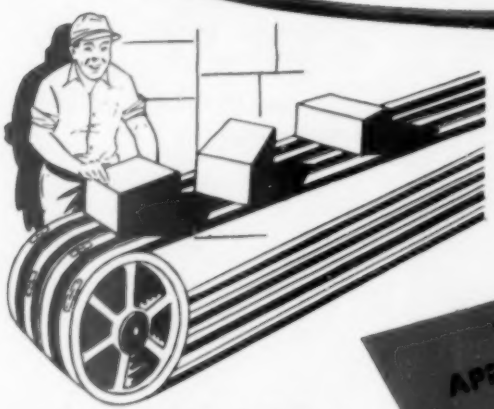
24—Sludge Vacuum Filter handles problem of waste disposal where drying beds and digesters are overloaded. "Coilfilter" maintains constant, peak level output; uses no cloths. Double-enveloping worm gearing gives smooth run. *Komline-Sanderson Engineering Corp.*

25—Warning Signal is for moving equipment, such as emergency vehicles, cranes, trucks. Reflects lamp beam at 96 flashes per minute. May also be used to mark hazardous areas where workmen may be hidden from view. *Pyle-National Co.*

Turn the page

V-BELTING BY THE MILE!

FASTENERS BY ALLIGATOR



Open-End V-Belting (in rolls) is now supplied by all major V-Belt manufacturers.

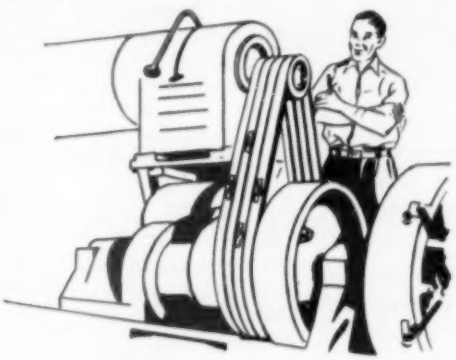
Improved ALLIGATOR V-BELT FASTENERS are recommended by all manufacturers of rubber V-Belts.

Convey with V-Belts?

With Alligator Fastened V-Belts you can make up conveyors any width, any length.

Need a 23'-3½" Long V-Belt?

. . . or one a mile long? Alligator Fastened V-Belts can be made up any length to fit any drive.



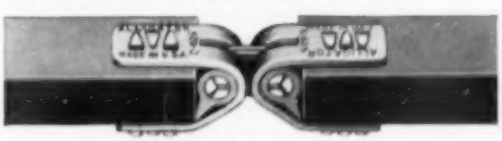
Got a shaft you want to go around?

Alligator Fastened V-Belts will do it. No need to dismantle anything.

FIXED CENTERS — NO MEANS OF TAKE-UP
Alligator V-Belt Fasteners solve this problem!

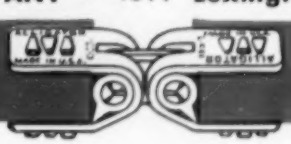
Mr. Design Engineer

Does this give you any ideas? As an original equipment manufacturer you may have an unusual V-Belt application . . . perhaps open-end V-Belting and ALLIGATOR V-Belt Fasteners are the answer. Send us detailed information and we will furnish test belt or set of belts.



Ask for Bulletins V-215A and V-216

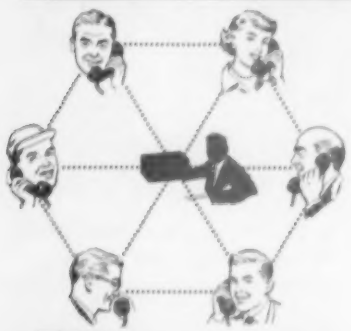
FLEXIBLE STEEL LACING COMPANY • 4611 Lexington Street, Chicago 44, Illinois

ALLIGATOR  V-Belt Fasteners

The sign of a good manager

Clear the backlog off your desk

Select-O-Phone



Specialized *INTERIOR* communications systems provide the modern executive with his most important labor-saving tool. Unlimited simultaneous service to any spot in the plant or office! Conference facilities—without loss of time! Privacy! And, of course, the clarity resulting from Kellogg's years of experience in the telephone field.

Kellogg's complete line of interior communications systems includes: Select-O-Phone... Relaymatic...and Pushbutton. One of these *money-saving* systems will fit your needs.

KELLOGG
A DIVISION OF IT&T

KELLOGG SWITCHBOARD AND SUPPLY CO.
A Division of International Telephone and Telegraph Corp.
QUALITY COMMUNICATIONS SYSTEMS
—o—
QUALITY COMPONENTS FOR INDUSTRIAL CONTROL

Kellogg Switchboard and Supply Co., Commercial Products, Dept. 12-D, 79 W. Monroe Street, Chicago 3, Illinois.
Gentlemen:
Please send Select-O-Kit telling how we can clear the desks with Kellogg specialized interior communications systems.

NAME _____
FIRM _____
ADDRESS _____
CITY _____ ZONE _____ STATE _____

FACTORY / EQUIPMENT REVIEW
Begins on page D-80

For more about these products, circle item numbers on Reader Service card next to back cover.

26 — Portable Exhauster-Blower ventilates one or several confined working areas at same time. "Octopus Junior" connects with flexible hose (to 50 ft.) to areas needing ventilation. Four 3-in., three 4-in., or single 8-in. adapter. *Chelsea Fan & Blower Co.*

27 — Dial-Phone Intercommunication System is built around unattended central switchboard through which each phone in network can be dialed directly. Provision for flip-switch communication with preselected personnel. For 10-1000 lines. *Radio Corp. of America.*

28—Heat Exchanger cools by evaporation, obtains temperature control (within 2 deg. F.) by modulating use of outdoor air. Casing shipped as flat panels, to be assembled on site, saving freight. Four sizes: 7-million to 18-million Btu./hr. *Niagara Blower Co.*

29—Fire Extinguisher on wheels is carbon-dioxide type. Cylinder engine is capped by lever-operated valve which permits immediate discharge. 50-, 75-, and 100-lb. capacity models. Twin 50-lb. cylinders can be operated independently or in tandem. *Fyr-Fyter Co.*

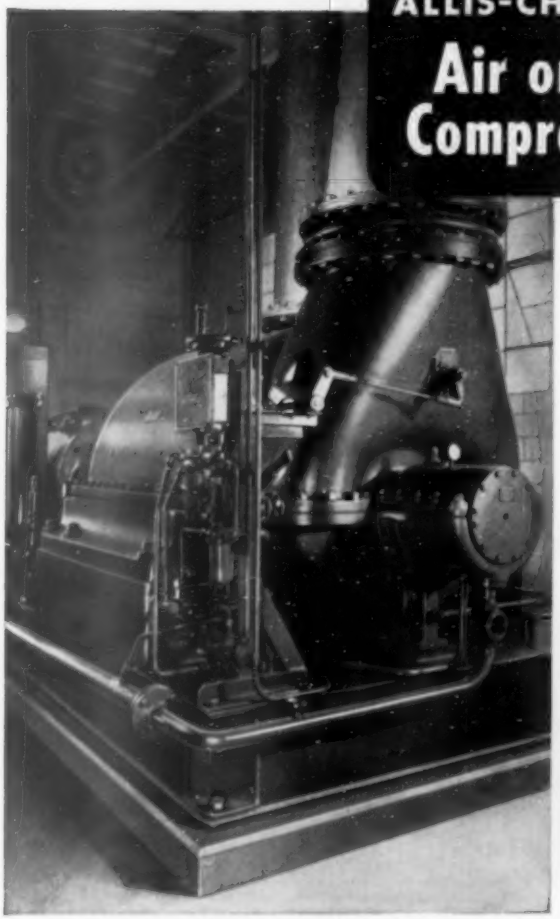
30—Roof Coating is compounded of three weather-protectors: aluminum, asbestos, asphalt. Result is durable, resilient coating, immune to chipping, peeling, sun-damage. Permite 3-A protects all roofing except wood. 1-qt. to 55-gal. drums. *Aluminum Industries, Inc.*

31—Transformers for distribution and power to 1000 kva. are oil-immersed, self-cooled units. Sturdy tanks eliminate possibility of oil leaks. They're electrically welded in a special manner and reinforced with external and internal ribs. *Marcus Transformer Co.*

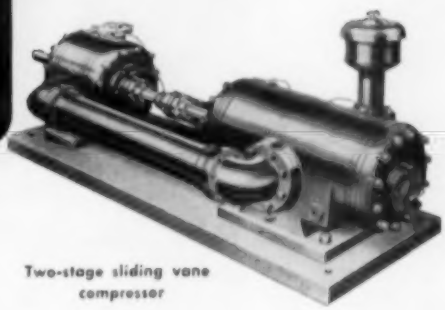
32—Unit Heater, gas-fired, is self-contained. Combines gas burners, combustion chamber, heat exchanger, motor-driven fans, fixed or re-

ALLIS-CHALMERS

Air or Gas Compressors



Four-stage motor-driven centrifugal air compressor rated 28,000 cfm inlet volume at 26 psig discharge pressure.



Two-stage sliding vane compressor

Any Volume Any Pressure

Single-stage centrifugal compressor

Axial compressor

Solve every process air or gas need from the most complete line of compressors

Whether you need single or multi-stage centrifugals, multi-stage axials, or sliding vane rotary compressors, Allis-Chalmers builds a type and size unit for the job.

Compressors that have run over two years without stopping have established Allis-Chalmers reputation for reliability.

One reason for such performance records is the smooth operation of Allis-Chalmers compressors . . . proof of careful engineering and manufacture. In addition, casings are rugged cast iron or steel, bearings are ample size and easily accessible for inspection and maintenance.

You need uninterrupted service and you get it with Allis-Chalmers compressors.

If motor-driven units are specified, Allis-Chalmers can furnish motors specially designed for chemical industry applications, together with coordinated control.

CHECK HERE FOR INFORMATION

- ☐ Single-stage sliding vane compressors
- ☐ Two-stage sliding vane compressors
- ☐ Single-stage centrifugal compressors
- ☐ Multi-stage centrifugal compressors
- ☐ Axial compressors

Add name and address in margin and send to your nearby A-C office or Allis-Chalmers, Milwaukee 1, Wis.

ALLIS-CHALMERS

A-4986

An offset eye may mean nothing to you, but an offset motor could cut floor maintenance costs for you.

The exclusive Kent floor machine design cuts labor costs up to 18.9% over center-mounted and divided-weight machines.

KENT EXCLUSIVE FEATURES:

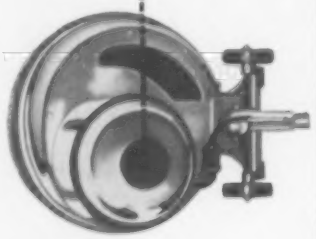
Balanced Power . . . minimizes torque, offsets handle weight

Floating Power . . . "cushioned" gears

"Power" Steering . . . fingertip control

Only 2 Gears

Fully Enclosed Motor . . . no dust, no dampness



Offset motor means Balanced Power

Imperfect balance and torque—sidewise pull of the brush—make ordinary floor machines hard to operate. Kent's exclusive offset motor counterbalances handle weight and minimizes torque . . . means less fatigue, faster work. All weight is evenly distributed on the revolving brush—longer wear, fewer service problems.

Kent's famous cleaning team uses a Kent industrial vacuum cleaner—for wet or dry pickup.

Cuts costs 18.9% more than competitive Floor Machines.

MAIL COUPON TODAY!

KENT Company, Inc.
456 Canal Street, Rome, New York

Yes, I want to cut maintenance costs! Send full details on your line of floor machines vacuums.

Name .....

Address .....

City ..... State .....

Begins on page D-80

For more about these products, circle item numbers on Reader Service card next to back cover.

volving discharge outlets. Ceiling suspended, with downward discharge. Input: 430,000 Btu. per hr *L. J. Wing Mfg. Co.*

33 — Metal-Enclosed Switchgear features breaker compartments isolated from bus, other breakers. Reversible panels permit closing doors with breakers in any position. Indoor or outdoor units to 600 volts a-c, 4000 amp., 100,000 aic. *Allis-Chalmers Mfg. Co.*

34—Steel Joists are resistance-welded on maker's assembly line. Eliminates hand welding by fabricator; delays for contractor. Lengths: 3-40 ft.; various widths and weights. Ambridge Joists provide ample freeway for pipe, conduit. *U. S. Steel Corp.*

35—Current-Limiting Busway has high reactance. For connection between service entrance and main switchboard, panel or wherever you want to reduce available short-circuit current. It has interrupting capacities of over 100,000 amp. *General Electric Co.*

36 — High-Capacity Submersible Pump is for general plant service, as well as such auxiliary jobs as fire fighting, air conditioning and cooling, processing. Series C capacities to 200 gpm. Heads to 450 ft. in 6- and 8-in. diameter wells. *Sumo Pumps, Inc.*

37—Insulated Wall Panels insulate three times better than 8-in. brick wall. Costs less to construct than masonry. Aluminum; steel; stainless steel; rigidized metal; aluminized steel; or fire-resistant, asbestos-protected metal wall. *American Steel Band Co.*

38 — Prefabricated Soundproof Room has high noise reduction characteristics in all frequency bands. Serves as office or lounge-relief room in noisy areas. Many sizes available. Dimensions can be changed by addition of panels. *Industrial Acoustics Co.*

Turn to page D-100

Quaker

Here's why this PETROCHEM fire hose is on guard throughout this D-X Sunray refinery

Get acquainted with your Quaker-Quaker Pioneer distributor. You'll find him of real help—not only for your regular needs — but also in emergency situations requiring extra fast supply. Write for free brochure and name of your nearest distributor.

This hose does *more* than fight fire. It fights off deterioration by oil and chemicals, stands up to abrasion, resists weather and functions safely under high pressure. Why? Because its oil-resistant Neoprene tube is enclosed in tough, wear-defying *Du Pont Dacron* impregnated with oil-proof Neoprene . . . this provides a tough, light, flexible hose, resistant to oil, both inside and out. Actually this hose is so strong that it can take pressures up to 500 lbs. and temperatures up to 300°F. . . . and so flexible that you can actually knot it. Easy to store, too! Either coiled or folded it takes little space.

These are some of the reasons why D-X Sunray's Oklahoma refinery has this hose . . . the first made for oil and chemical industries, at all fire stations . . . and why it will pay you to consider it in your safety planning. Complete Quaker-Quaker Pioneer line includes hose for every purpose, belting, packing and moulded rubber for every use.

DIVISIONS OF HKP H. K. PORTER COMPANY, INC.

H. K. PORTER COMPANY, INC.
QUAKER RUBBER DIVISION
Philadelphia 24, Pa.
QUAKER PIONEER RUBBER DIVISION
San Francisco 7, California

Explosion Proof Twins!

COMPLETELY Explosion-Proof!

Yes, this is the *first* industrial vacuum cleaner which combines portability, efficiency, and *complete safety.*

The MULTI-CLEAN H-500 EXPLOSION-PROOF Vac has been tested by UL and approved for use in Class I, Group D and Class 2, Group G locations.

This now means that you can use this wet-dry vac amid gases, vapors, dust, and in dozens of other situations where danger of explosion or fire had previously made use of a vac too risky.

It's ideal for cleaning floors, walls, overhead pipe, machinery or stock bins where there is grease, chemicals or other flammable materials. And since it works equally well for wet or dry pickup, it's just the thing for cleaning material from storage tanks.

Mills and elevators, chemical plants, petroleum refineries, gas plants, and distilleries are just a few of the locations where this new vac is especially suited.

For more information on the H-500, its powerful ⅞ hp totally enclosed motor, its 100% bronze or aluminum construction, and its spark-proof electrical fittings . . . see your local MULTI-CLEAN Distributor or mail coupon below.

MULTI-CLEAN *Explosion-Proof* Machines are engineered for scrubbing, cleaning, buffing, and polishing in presence of combustible gases, liquids, dust. Available in 14" and 16" sizes.

Multi-Clean Explosion-Proof Floor Machine

MAIL COUPON TODAY!

MULTI-CLEAN PRODUCTS, INC., Dept. FM-46
2377 Ford Parkway, St. Paul 1, Minn.

Gentlemen: Send me complete information on the:

☐ Explosion-Proof Vacuum Cleaner
☐ Explosion-Proof Floor Machines

Name _____ Title _____

Firm _____

Address _____

City _____ Zone ___ State _____

Wheelabrator's®

ultra-filtration closes the door on atmospheric dust

Super-clean air for all plant areas and operations where atmospheric dust is intolerable, is now possible at low cost with Wheelabrator Ultra-Filtration. This simple, highly efficient process filters out dust you can't even see — at a cost lower than conventional devices having efficiencies as much as 30% lower.

Existing installations in electrical control and transformer rooms, sewage disposal plants, substations, etc., prevent costly breakdown of precision machinery, instruments and controls and improve the quality of precision-made products.

Open the door to new savings by closing the door on atmospheric dust, with Wheelabrator Ultra-Filtration. Write today for information. Ask for Bulletin No. 557-D.

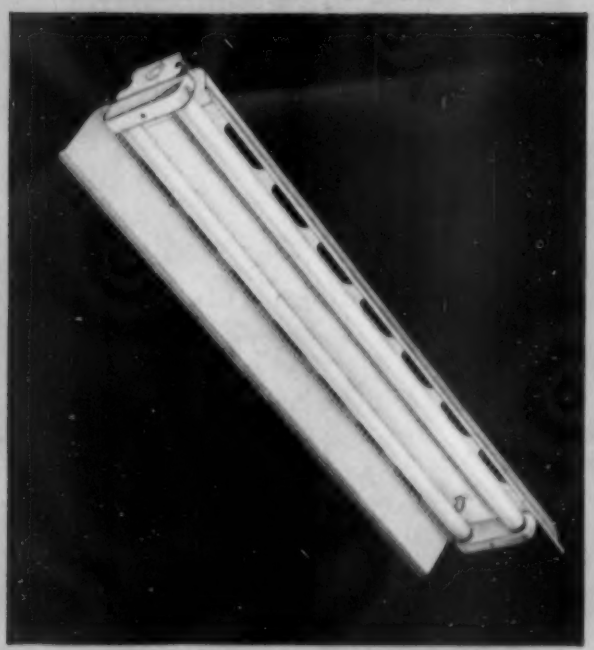
WHEELABRATOR
CORPORATION

374 S. Byrkit St., Mishawaka, Indiana

25%
UPWARD LIGHT

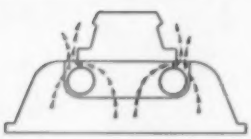
The Diamond-"I"—New Sylvania semi-direct fixture has 25% upward light component. Extremely high 89% illumination efficiency. Captive bolt arrangement simplifies installation and maintenance. Meets or exceeds all new RLM specifications.

10%
UPWARD LIGHT



NTWS Series—Complete Sylvania semi-direct series for many industrial applications. Features 10% upward light component, extremely high efficiency. Available with closed or open-end reflectors. RLM approved.

WHICH DOES YOUR PLANT NEED?



Reflector slots in Sylvania semi-direct fixtures create a "chimney effect" of rising air which dissipates lamp heat, carries away dust and dirt from lamps and reflectors, allowing lamps to operate at peak efficiency.

PERHAPS *your* plant would benefit from new lighting equipment which directs a full 25% of its light *up!*

Sylvania's outstanding new Diamond-"I" fixture answers industry's need for more *upward* light and reduction of eye-straining overhead contrasts, delivers more and better light at working level. It's the fixture which meets or exceeds all new RLM specifications for fixtures with greater upward components of light. And it has an extremely high illumination efficiency of 89%.

Or, if preferred, Sylvania's complete line of NTWS fixtures will fill the bill for applications using 10% upward light.

Whichever of these Sylvania fixtures suits your needs—Diamond-"I" or NTWS—you can be sure of getting lowest maintenance cost with either. On both types, one man can easily change lamps. Reflectors on both series are always 4 feet long—on both the 4- and the 8-foot units.

The Sylvania lighting specialist in your area will gladly discuss your lighting problems with you. The coupon below will bring you complete technical data.

SEND FOR HELPFUL TECHNICAL DATA

Sylvania Electric Products Inc.
Dept. D1, Lighting Division—Fixtures
One 48th Street, Wheeling, West Virginia

☐ Please send me information on your industrial fixtures.
☐ Have a Sylvania lighting specialist call on me.

Name_____ Title_____

Organization_____

Address_____

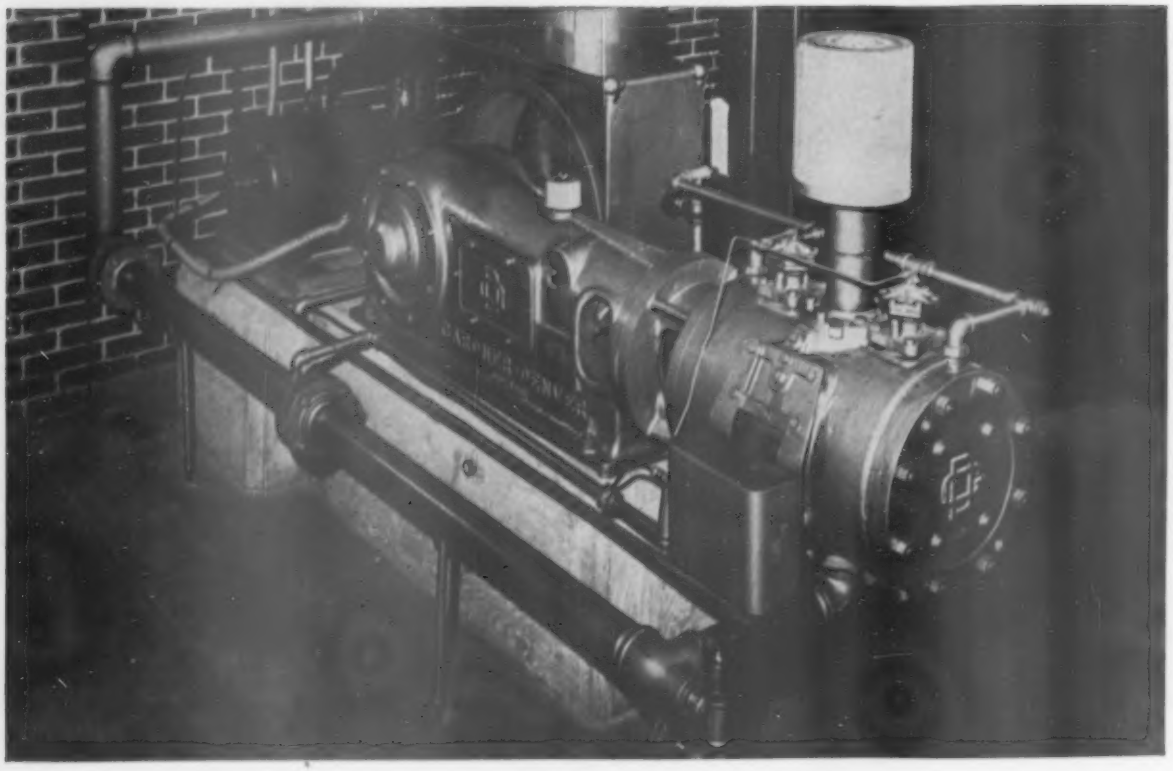
City_____ Zone____ State_____

SYLVANIA®

... fastest growing name in sight

LIGHTING • RADIO • ELECTRONICS • TELEVISION • ATOMIC ENERGY

Gardner Denver . . . Serving the World's Basic Industries



Oil-Free air with no maintenance penalty . . . Gardner-Denver Carbon Piston Compressors

Pure, oil-free air that's safe for textiles, plastics, foods, beverages, automation instruments. Low-cost air that's economical for maintenance tools and regular plant operation.

You get *both* from the Gardner-Denver CRX Carbon Piston Compressor.

Self-lubricating carbon, used for pistons and other parts, does away with any need for oil in the cylinder. Yet, user reports show that cost per cubic foot of air compressed by the CRX matches usual compressed air costs. There's no maintenance penalty—no need for two separate compressed air systems in your plant. Send for Bulletin CRC-10 today.

The safe, efficient way to remove loose lint from cotton spinning machinery—the Keller Tool Roll Picker. Write for complete details.

GARDNER-DENVER

THE QUALITY LEADER IN COMPRESSORS, PUMPS, ROCK DRILLS AND AIR TOOLS FOR CONSTRUCTION, MINING, PETROLEUM AND GENERAL INDUSTRY

Gardner-Denver Company, Quincy, Illinois
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HOW TO PUT HALLOWELL SHOP DESKS TO WORK IN YOUR PLANT

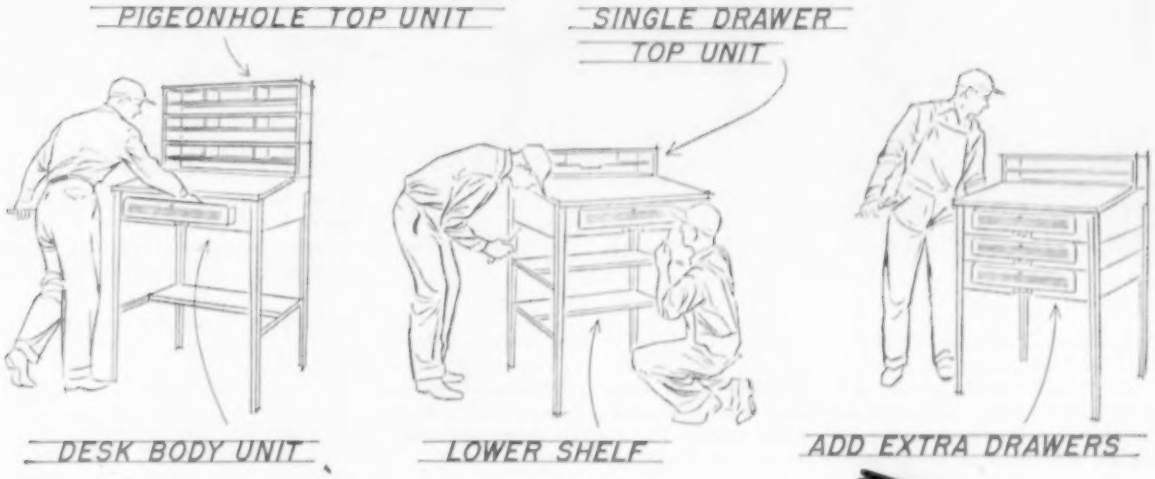
BUY THESE STANDARD MODELS

MODEL 400

MODEL 406

MODEL 409

OR USE INTERCHANGEABLE PARTS TO CUSTOM BUILD THESE DESKS



Sturdy steel for years of use · Large, smooth writing surface · Drawers that glide on roller bearings, have recessed drawer pulls · Built-in lock · Green baked-on enamel finish · Stocked by leading shop equipment dealers · Ask for Bulletin 728 · Hallowell Shop Equipment Division, Standard Pressed Steel Co., Jenkintown 11, Pa.

HALLOWELL SHOP EQUIPMENT DIVISION
STANDARD PRESSED STEEL CO.
SPS
JENKINTOWN PENNSYLVANIA

BENCHES (CABINET, WORK, UNIT) • STOOLS AND CHAIRS • SHOP DESKS • TOOL STANDS AND CABINETS • DRAWERS, DRAWER TIERS • STEEL CARTS • SHELVING

"Buffalo"

SKY-VENT ROOF VENTILATORS

CAPACITIES: 1,000 cfm through 250,000 cfm

SIZES: 12″ through 120″

"Buffalo" high volume power roof ventilators are designed to ventilate large plant areas not adjacent to outside walls or where expensive and bulky duct work is impractical. This type of ventilation lends itself well to rearrangement of plant layout without consideration for the ventilating system.

The "Buffalo" Propeller or Axial Type Fan in the stack has all the strength, efficiency and smooth operation that characterizes the "Q" Factor* in all "Buffalo" Fans. Recently introduced, these new units are being adopted by many of the country's largest plants for removing hot air, fumes and fogs from large areas. Why not investigate? Write today on your company letterhead for Bulletin FM-1234 and other descriptive material.

Style "V" Sky-Vent

Style "H" Sky-Vent

Counterbalanced dampers open when fan starts, close by gravity over V-shaped trough at top of inner cylinder when fan is shut off. Heavy gage stack contains integrally welded gussets supporting motor and propeller fan. Outside gussets provide rigidity, minimize vibration. For easy installation, a flanged roof curbing plate is welded to the stack.

**The "Q" Factor — the built-in Quality which provides trouble-free satisfaction and long life.*

The Style "H" Sky-Vent head is made of heavy gage galvanized steel with integrally rolled stiffening flanges along its entire length and is internally braced with one-piece welded square hollow tubular frame. Hood design minimizes friction loss as air leaves unit.

The extra heavy galvanized steel stack with integral flanged curb plate has offset stiffening panels rolled into the side sheets and on larger sizes is further braced with one-piece welded square hollow tubular frame. Gravity, manual or motor operated shutters are available, mounted in the stack. Disconnect switch and internal wiring can be provided.

BUFFALO FORGE COMPANY
BUFFALO, NEW YORK

Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

"Buffalo"

INDUSTRIAL EXHAUSTERS BELTED VENT SETS PROPELLER FANS "E" BLOWERS-EXHAUSTERS

FACTORY / EQUIPMENT REVIEW
Begins on page D-80

For more about these products, circle item numbers on Reader Service card next to back cover.

39—Switchgear, metal-enclosed, is safe and compact. Can be tested with compartment doors closed. Escutcheon and visual indicator are extendable through door. Available in 3-high frame arrangement. For 600 volts and below, 3000 amp. *I-T-E Circuit Breaker Co.*

40—Fire Control detects fire in earliest stage. Invisible combustion gases are enough to set it off. Radioactive system sounds alarms, closes fire doors, activates extinguishers, alerts fire department, spots and indicates location of fire, various other uses. *Pyrene Mfg. Co.*

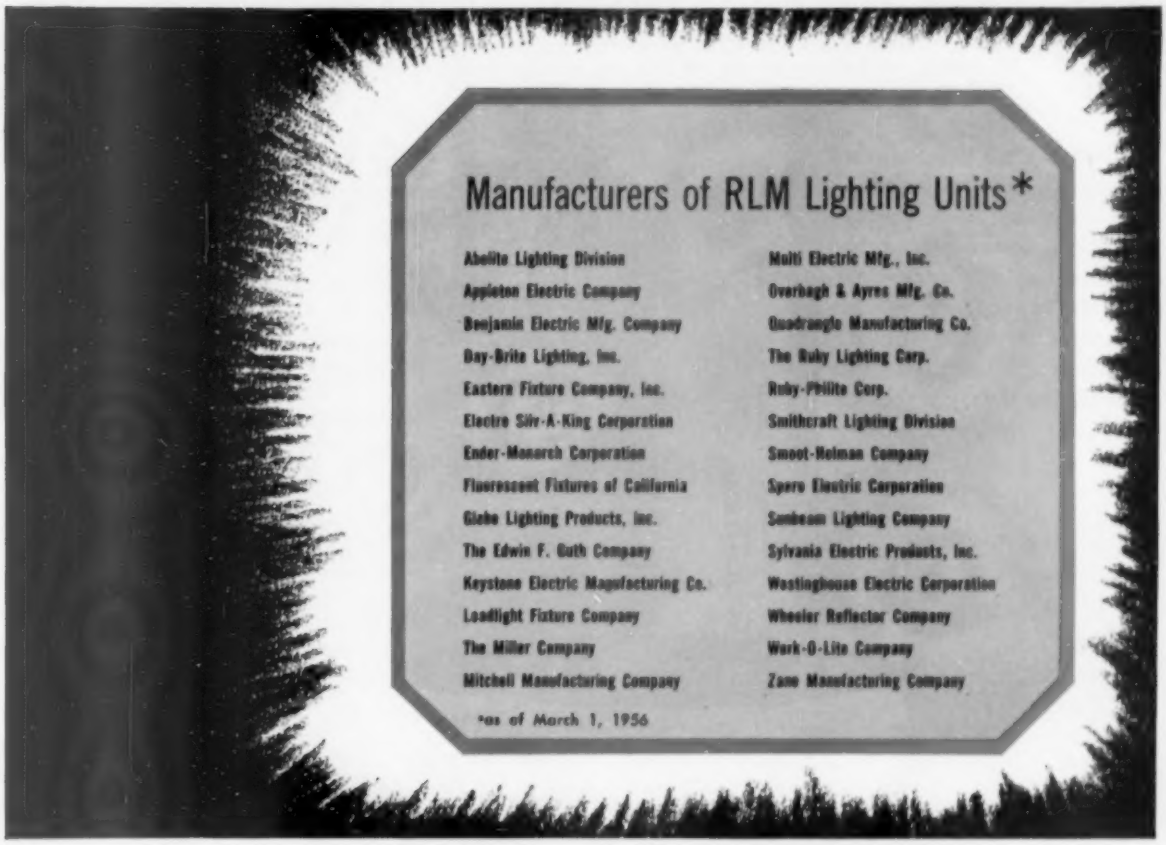
41—Emergency Packaged Communication consists of 250-ft. cable reel (holds 400 ft.), two telephones. Portable, self-contained unit needs no batteries, no outside power; phone is actually voice-powered. For constant service or "standby." *Wheeler Insulated Wire Co.*

42—Flangeless Wireway has hinged covers so conductors can be "laid in" rather than "fished through"; are always accessible. Fittings have same hinged covers, enabling unbroken system. Besides wireway, suitable for connecting loadside switches, meters. *Keystone Mfg. Co.*

43—Pyrex Heat Exchanger, shell and tube, is impervious to corrosion. Operating temperatures to 375 deg. F. on shell side, 200 deg. F. on tube side; pressures to 20 psi. Can be used as condenser or cooler. Compact and lightweight. *Corning Glass Works.*

44—Cooling Water Treatment for controlling scale and corrosion is a phosphate in plate form. Bag containing plates is hung in water spray. Eliminates cutting water lines or special plumbing. Scale remover and algaecide are companion products. *Calgon, Inc.*

45—Colored Window Panes boost worker morale, solve daylighting problems. Light rose for gloomy areas, light blues give high light



Look to these leading manufacturers for Industrial Lighting Units with the RLM Label NOW MORE VALUABLE THAN EVER!

With continuous advancements in RLM Specifications, the RLM Label on an industrial lighting unit stands for ever-higher quality standards in lighting equipment performance and construction. Alert, forward-looking manufacturers realize that this makes the RLM Label more valuable than ever to buyers, specifiers and users of industrial lighting equipment. That is why you will recognize the 28 RLM manufacturers above as the leading names in their field . . . companies who will faithfully adhere to the RLM Standard Institute's rigid program of certification . . . firms which gladly submit to the strict RLM testing and inspection program, which assures uniform quality and conformance to standards by periodic inspection on the assembly line and in the field. Today, these manufacturers are especially proud to be able to bring you units bearing the RLM Label, because they know that it is now of even greater value to you than ever before.

Today, the RLM Label stands for higher-than-ever specifications like these:

Incandescent and Fluorescent: New High Reflection Factor. New High Light Output.

Fluorescent: All-White Porcelain Enamel Reflectors. Upward Light for more Brightness Control. Shielding Angles for less Lamp Glare.

For a complimentary copy of the 1956 RLM Specifications Book, write: RLM Standards Institute, Suite 829, 326 W. Madison St., Chicago 6, Ill.

R-1239RR

LOOK FOR MANUFACTURER'S NAME HERE
COMPLIANCE WITH SPECIFICATIONS APPROVED BY RLM STANDARDS INSTITUTE
ELECTRICAL TESTING LABORATORIES, INC.

RLM STANDARDS INSTITUTE
INCORPORATED
The Seven RLM Stand for Reflector and Lighting Equipment Manufacturers

"Foundry work is rugged

We sweat it out to make sure there'll be few rejects. But we don't mind, just so we get cool water when we want it. We know we can . . . we've got Halsey Taylors."

Whether it's a foundry or a steel mill, a fabricating shop or a textile plant, Halsey Taylor Coolers contribute to production efficiency. Day in and day out they provide a plentiful supply of cool, refreshing water . . . unfailingly! The Halsey W. Taylor Co., Warren, Ohio.

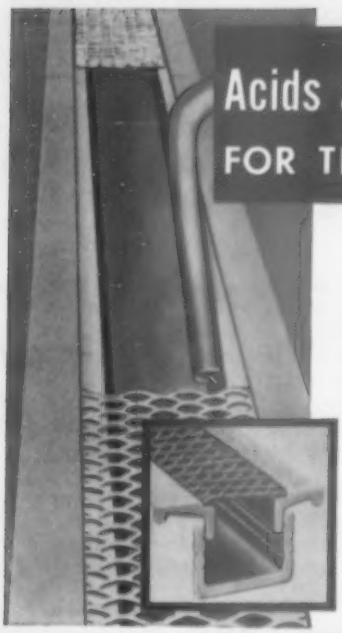
• At left—cooler with stainless steel top
• Below—remote type cooler

SEE OUR CATALOG IN SWEET'S

HALSEY TAYLOR

Industry's Favorite Coolers

P-61



Acids are Safer *Two Ways* FOR THIS MANUFACTURER!

Chemi-Drain CHANNEL PIPE

1. Channels Hot Sulphuric Dilute for Processing
2. Safely Drains Corrosive Waste Chemicals

Harkness & Cowing Division of Arnold-Hoffman & Co., Cincinnati, solved a dual acid channeling problem with Chemi-Drain. It carries hot sulphuric dilute to a tiled vat for a tallow reclaiming process, and intermittently, serves as a drain system for corrosive chemicals. Chemi-Drain is completely unaffected by acids or other corrosives. It is designed for flush-with-the-floor installations that can be covered by a grill or removable plate. *Write for a four-page bulletin with full details.*

LC-256-6

first TO GUARANTEE LOGAN ESTABLISHED 1890

THE LOGAN CLAY PRODUCTS COMPANY • BOX 698J, LOGAN, OHIO

For more about these products, circle item numbers on Reader Service card next to back cover.

transmission, cool green for sunny areas. Colors built into shatterproof fibrous glass. Five sizes. *Alsynite Co. of America.*

46—Translucent Building Panels are reinforced with glass fiber and nylon. Parallel nylon strands give more rigidity and greater resistance to heavy loads and impacts. "Filon" made in 20 colors, crinkled and smooth finishes, 6- and 8-oz. weights. *Plexolite Corp.*

47—Bend-able Concrete, of rubber latex and cement powder, gives without cracking. Ideal heavy-duty flooring for new toppings, repairing worn or damaged concrete, resurfacing unloading areas, etc. Adheres to steel, aluminum, brick, tile, glass. *U. S. Rubber Co.*

48—Aluminum-Sheathed Cable is for continuous operation at 150 deg. C.; under certain conditions, up to 200 deg. Seamless sheath eliminates conduits, resists corrosion, is small in diameter. Silicone rubber insulation resists flame, heat, moisture, ozone. *Okonite Co.*

49—Prefabricated Acoustical Walls have a noise reduction coefficient of 0.85. Wooden spline and three bolts all that's needed to lock Soundex sections. Made in 4- and 5-ft. lengths, 7- or 8-ft. heights, 2½ in. thick; glazed or unglazed. *G R Products, Inc.*

50—Circuit Breaker Enclosures for hazardous locations are made of nodular cast iron. Permit stronger construction yet lighter weight—45% over ordinary cast iron, says maker. Type 7 enclosures available for AB-1 breakers, 15-100 amp. *Westinghouse Electric Corp.*

51—"TransWall" is a flexible, movable wall—actually a folding curtain—that isolates machine and production noise, areas that are potential fire hazards or dangerous to personnel. Curtain is made of "Bemisorb," flame-resistant and sound-reflecting. *Bemis Bro. Bag Co.*

AIR CONDITIONED TRIPOD

Texas Tower radar "Island" keeps cool with AIRTEMP Air Conditioning

Under a blazing summer sun, this offshore air defense Texas Tower radar "island" could literally *cook* the Air Force crews that man it. But not with Airtemp air conditioning on the job!

Cool, clean, healthful air, provided by packaged chiller units, helps keep radar crews alert...helps precision radar stay accurate. Thus, men and equipment alike perform efficiently in this vital link of our early warning network.

It's unusual air conditioning to be sure, but just a routine application for top engineers of Airtemp Construction Corporation. As air conditioning specialists, these men provide efficient systems for buildings, offices and stores of every kind.

Their experience, plus years-ahead engineering by Chrysler, assures dependable, trouble-free air conditioning through the years.

When *you* specify Airtemp, you help clients cut operating costs, attract new business, increase profit dollars. Let your Airtemp distributor give you the facts. Or, write: *Airtemp Construction Corp., Dept. FM-4-56, Dayton 1, Ohio.*

Airtemp
CONSTRUCTION
CORPORATION
SUBSIDIARY OF CHRYSLER CORP.

AIRTEMP BUILDS AIR CONDITIONING TO MEET EVERY REQUIREMENT

Which of these LEGGE POLISHES best suits your NEEDS?

WANT TO ELIMINATE BUFFING?

LEGSURE: *For all resilient floors.* This resin-type water-emulsion Safety Polish coats floors with a tough-wearing, dirt and water repellent film. Gleams *without buffing.* Slip-resistant, scuff-resistant. Lasts for *months.*

PREFER TO CONTINUE BUFFING?

LECO: *For all resilient floors.* This water-emulsion polish goes up to *75% beyond* U. L. requirements for slip-resistance. It's a bear for wear even under the daily punishment of heavy traffic, high heels and moved furniture. Rarely needs stripping.

LEGGE — POWER BASE WHEN YOU WANT TO STRIP OR WAX

LEGGE SYSTEM of Safety Floor Maintenance

UL

ALL LEGGE POLISHES are certified by Underwriters' Laboratories. Save up to 33⅓% on labor and materials with a LEGGE-designed Maintenance System. For details, clip coupon today.

Walter G. LEGGE Company, Inc.
Dept. A-4, 101 Park Ave., New York 17.
Branch offices in principal cities.
In Toronto—J. W. Turner Co.

☐ Send me your Free floor maintenance booklet: "Mr. Higby and the Gremlin".

Name_____

Firm_____

Street_____

City_____ Zone____ State_____

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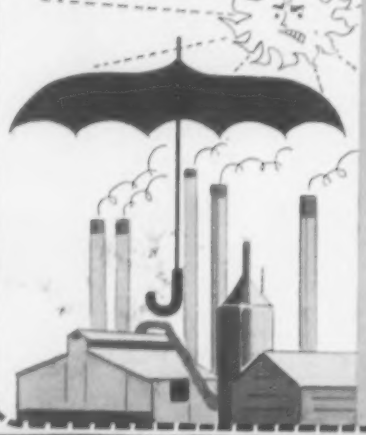
if you can't do this... **DO THIS!**



The Mark of Quality Protection —MARKAL!

Markal PROTECTIVE COATINGS

HEAT-PROOF TO 2100°F.

You get real protection when you brush or spray MARKAL COATING "S-R" on your stacks . . . protection against corrosion, scaling and oxidation at temperatures high as 2100°F.

SEND TODAY for detailed information on Markal Protective Coatings. Free!

MARKAL COMPANY • 3109 West Carroll Avenue • Chicago 12, Illinois

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Leaves air mint fresh!

Mintol

the multi-purpose industrial disinfectant with the fresh mint leaf aroma

MINTOL disinfectant has a coefficient of 9. Diluted half a cup to the pail of water, it meets the new Use Dilution Confirmatory Test.

Kills bacteria. Mintol sanitizes the surface. Just dilute and apply with mop. Instead of a druggy odor you'll get that refreshingly modern mint fragrance.

Deodorizes. Add one-quarter cup of Mintol to your favorite cleaning solution and apply with mop. You will deodorize as you clean—do both jobs with the same swish of the mop.

★

For free sanitary survey of your premises ask your Dolge service man

For literature about MINTOL and other Dolge products write to The C. B. Dolge Company, Westport, Conn.

Dependable DOLGE TRADE MARK

Let this "Visiting Fireman" train your men to fight fire . . . it could save your business

You have a *potential* fire-fighting team right in your plant. These would-be fire fighters *could save your business if fire struck unexpectedly.* All they need is training, the kind that will enable them to respond instantly and properly to any kind of fire emergency.

Ansul can provide this training for a group of your men just as it has for hundreds of its customers. And there will be no charge. It is just one of the "essential" services that Ansul provides for its customers.

Twenty years experience in the fire protection industry has proved to Ansul many times over that all the fire equipment in the world will not save your business *unless* trained hands are available to man that equipment. So, it is important to Ansul that you get *training* along with the fire equipment you buy. Only then will you experience the security that goes with having a complete fire protection program. Only then will you get what you really pay for, what you really need—*complete fire protection.*

You owe it to the life of your business to learn more about Ansul's in-plant fire training service. Get in touch with your local ANSUL MAN through the yellow pages of your phone directory, he will be happy to call on you and explain all of Ansul's customer services in detail. Or write to THE ANSUL CHEMICAL COMPANY, Dept. FM-4, Marinette, Wisconsin.

ANSUL

LAMSON AIRTUBE AUTOMATIC SWITCH SYSTEM REDUCES COMMUNICATIONS TIME TO SECONDS!

The above photograph shows the locations of stations of the Lamson Airtube system and their distances from the monitor at the vast J. L. Clark Manufacturing Co., Rockford, Ill. Distances shown in air feet. Walking distances are much greater. Every carrier passes through the monitor . . . the automatic control switching point. The monitor automatically deflects the carrier into the tube leading to the correct station. The photographs at the left show typical Airtube stations in Office and Plant.

In 300,000 Sq. Ft. Plant!

Huge as the J. L. Clark plant is, Lamson's Airtube Automatic Switch System has brought the farthest departments only seconds away from each other.

Lamson has reduced hourly trips to merely 1 or 2 daily to handle bulky items. The handling of correspondence, time cards, instruction sheets, shipping schedules, receiving slips, memorandums and requisitions between departments has increased in speed and efficiency. Executives save valuable hours of "between office" time. Supervisors can devote more time to "on the job" supervision because they're freed from message carrying.

Lamson Airtube carriers . . . also bearing small product samples and tools . . . automatically discharge at any pre-determined station. The correct station number is dialed by turning the bands on the carrier.

For complete details as to how Lamson can improve the speed and efficiency of communications in your plant, MAIL THIS COUPON TODAY.

LAMSON 75th YEAR

Plants in Syracuse and San Francisco
Offices in Principal Cities

Lamson Corporation,
3244 Lamson Street, Syracuse, New York
Please send me a free copy of "Lamson Airtube Automatic Switch System" Bulletin.

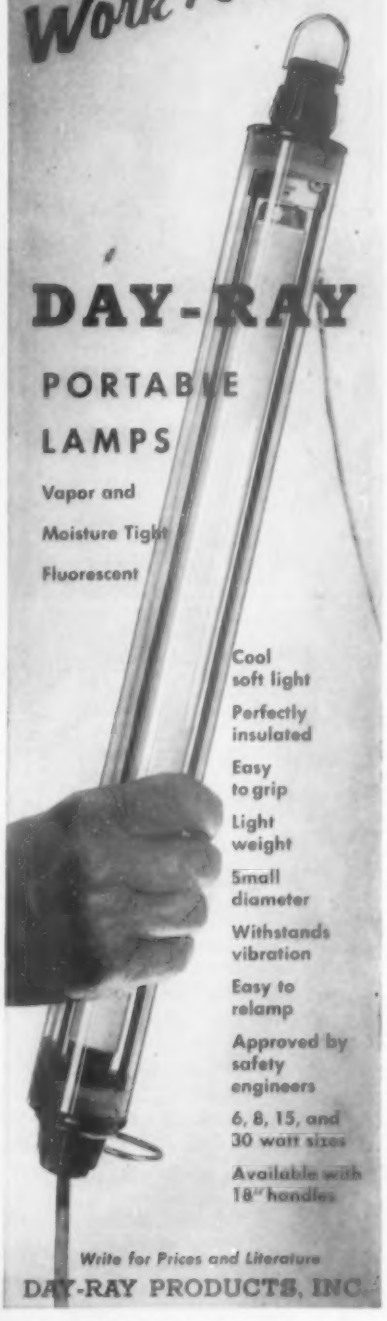
NAME_____ TITLE_____

COMPANY_____

ADDRESS_____

CITY_____ ZONE_____ STATE_____

Lights Up Darkened Work Areas!



DAY-RAY PORTABLE LAMPS

Vapor and Moisture Tight Fluorescent

- Cool soft light
- Perfectly insulated
- Easy to grip
- Light weight
- Small diameter
- Withstands vibration
- Easy to relamp
- Approved by safety engineers
- 6, 8, 15, and 30 watt sizes
- Available with 18" handles

Write for Prices and Literature

DAY-RAY PRODUCTS, INC.

Dept. F4, 1133 Mission Street
South Pasadena, Calif.

THERMAC COMPANY
protects its property *Automatically*.... gets better FIRE and BURGLARY PROTECTION and

SAVES $7,000 A YEAR

The complete automatic protection supplied our company by ADT Services has proved more effective in safeguarding our property and continuity of operations than former methods. In addition, it has made it possible for us to save $7,000 a year.

J. H. Turner
Secretary-Treasurer, Thermac Company

After trying other methods of safeguarding their premises, the Thermac Company, a Los Angeles concern specializing in general machine work and manufacture of gas furnace shut-off valves, found that they could get better protection at lower cost by a combination of ADT Aero Automatic Fire Alarm and ADT Burglar Alarm Services.

The satisfaction with this type of protection expressed in Mr. Turner's endorsement reflects the opinion of hundreds of business executives throughout the country, who are saving money while obtaining greater security against fire, burglary, and other hazards.

Whether your premises are new or old, sprinklered or unsprinklered, the appropriate ADT Fire Alarm Service will detect fire and summon the fire department *automatically*. To guard against burglary or intrusion, ADT Burglar Alarm Service detects the attack and *automatically* notifies police or other protective forces. ADT Heating and Industrial Process Supervisory Service maintains a constant *automatic* check on heating plants and certain manufacturing operations to detect and report abnormal conditions.

ADT protects, electrically, many billions of dollars' worth of tangible and intangible assets owned by 56,000 subscribers in 1,600 communities. An ADT specialist will show you how combinations of engineered services can protect *your* property.

Call our Commercial Department if we are listed in your phone book; or write to our Executive Offices.

ADT

Controlled Companies of
AMERICAN DISTRICT TELEGRAPH COMPANY
A NATIONWIDE ORGANIZATION
Executive Offices
155 Sixth Avenue, New York 13, N. Y.

STOP...

Metal cleaning can be Automated, too!

Don't pyramid your production costs by using hand-operated metal cleaning methods. Detrex cleaning equipment can be built right into your automated line, thus eliminating slow and costly manual labor. In fact, Detrex has been building automated degreasers and washers for years.

Keep your metal cleaning processes in step with the rest of your production. Rely on Detrex quality and experience to maintain the pace. Mail the coupon for complete information on Detrex equipment or check your Sweet's Plant Engineering File.

☐ I am interested in automating my ____degreasing ____washing operation.

☐ Please send literature on standard Detrex equipment.

NAME _____

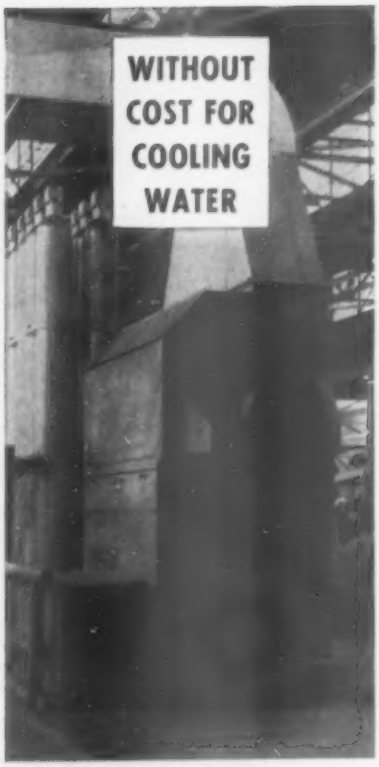
COMPANY _____

ADDRESS _____

CITY _____ ZONE _____ STATE _____

DETREX CORPORATION Dept. A-117
BOX 501, DETROIT 32, MICH.

DEGREASERS • DEGREASING SOLVENTS • WASHERS • ALKALI AND EMULSION CLEANERS • PHOSPHATE COATING PROCESSES



ACCURATE TEMPERATURE CONTROL of Hydraulic Liquids PREVENTS LOSSES

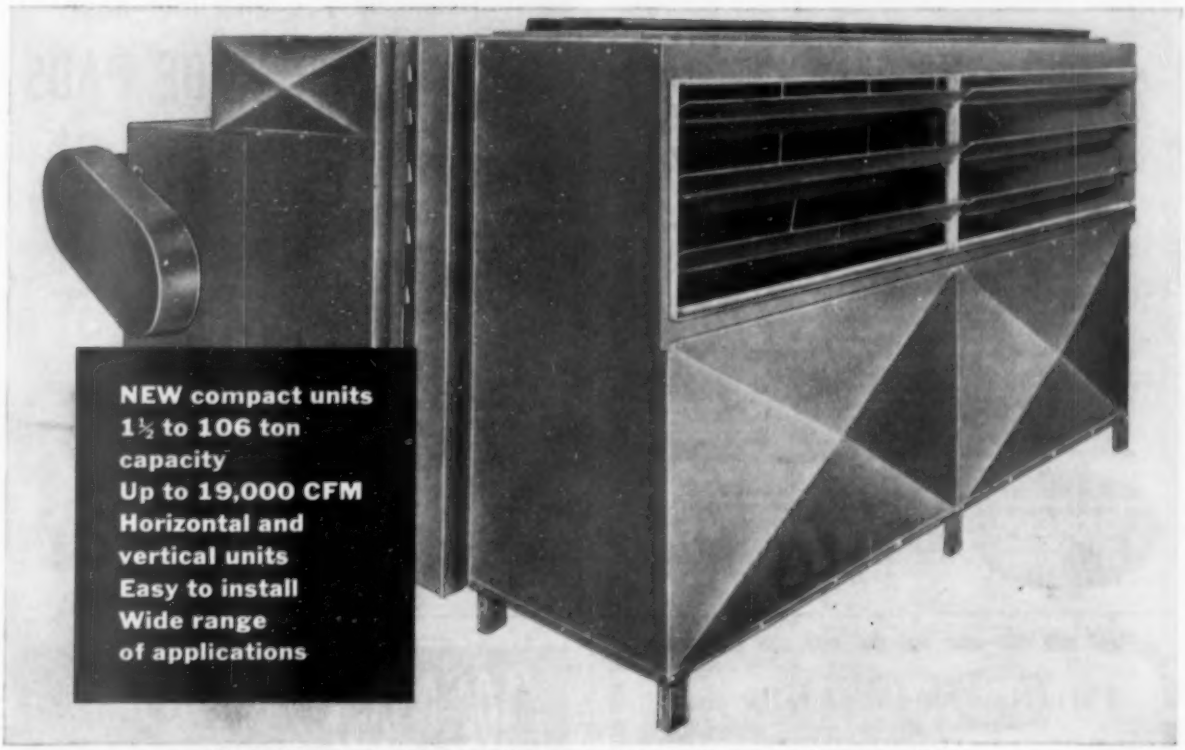
• This NIAGARA AERO HEAT EXCHANGER cools the liquid for a large hydraulic press, preventing heat damage to the pump stuffing boxes. Using outdoor air as the evaporative cooling medium, it removes the heat at the rate of input (1,875,000 BTU/hr.) with no cooling water consumption except a negligible amount evaporated.

Similar Niagara machines cool water, oils, solutions, lubricants and coolants for many mechanical, electrical and chemical processes. In a closed system, your coolant is never contaminated. The system is simple and easy to keep up; the equipment has a long, useful life.

Write for Bulletin 120
for a complete description

NIAGARA BLOWER COMPANY
Dept. F, 405 Lexington Ave.
NEW YORK 17, N. Y.
District Engineers in Principal Cities of United States and Canada

The most ADAPTABLE AIR CONDITIONER ever offered



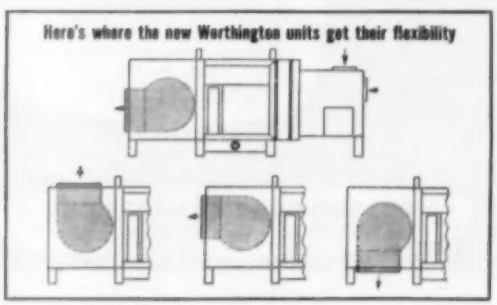
Horizontal construction permits suspension of unit from platform or ceiling. Shown here is large-sized unit with damper section.

New Worthington units save you space, time and money

Extreme FLEXIBILITY of the new line of Worthington air conditioners permits you to install them as you wish, where you wish—saving you valuable space, time and installation costs.

Designed to work with a central refrigeration system these new units fit your exact requirements—from large plants and offices to small stores and shops.

The fan section may be mounted with front, top or rear discharge—as shown in the diagram below. The motor can be mounted on the top, front, back or at either end.



Here's maximum adaptability in every installation!

Standard unit consists of base section, fan section and coil section—all constructed of rugged, fabricated steel that is Bonderized and coated with a corrosion resistant enamel. For more facts on this new line write Worthington Air Conditioning, Sec. A6105, Harrison, N. J.

A-6105

- **exclusive 3½" motor base adjustment for true belt tension**
- **up to 81 coil combinations**
- **quiet, dynamically balanced fans**
- **accessories interchangeable between horizontal and vertical units**
- **accessibility—easily removed fan section and panels simplify inspection**

WORTHINGTON

CLIMATE ENGINEERS TO INDUSTRY, BUSINESS AND THE HOME

Safer liquid transfer for MODERN INDUSTRY

Want to handle industrial liquids with greater safety? Then install Tokheim hand pumps—specially adaptable to maintenance and production work. They help prevent spilling, slopping, over-filling, dripping. Your plant is kept cleaner—work is speeded—waste halted—accidents prevented.

Operating on both forward and backward strokes, these efficient pumps deliver 20 gallons per 100 strokes. Available with hose or spout outlets—also other interchangeable accessories. No plant should be without a battery of Tokheims.

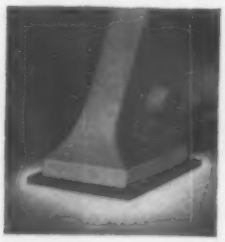
Call your dealer, your Tokheim representative; or write today for literature

QUALITY TOKHEIM HIGH-VACUUM HAND PUMPS

General Products Division
TOKHEIM CORPORATION
Designers and Builders of Superior Equipment
Since 1901
1652 Wabash Ave. Fort Wayne 1, Ind.

Subsidiaries: Tokheim N. V., Leiden, Holland—GasPro, Inc., Shelbyville, Ind.
Factory Branch: 1389 Howard Street, San Francisco 3, California
In Canada: Tokheim-Reader of Canada, Ltd., 205 Yonge St., Toronto, Ont.

TAKE THE SHOCK OUT OF PUNCH PRESSES

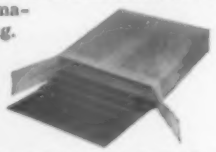


. . . with low-cost ISOMODE® PADS

Made of long-lasting Du Pont neoprene, these ribbed, resilient pads have proved successful in isolating troublesome machine shock and vibration in thousands of plants . . . even on punch presses.

This low-cost method of shock and vibration control helps reduce building damage and machine maintenance — muffles annoying plant noise.

Best of all — it costs very little to install Isomode Pads. Simply cut the economical pads to fit machine feet . . . that's it! No waste, no fuss — machines stay put without bolting. Try a package and see. Write for prices and Application Bulletin No. 415.



MB MANUFACTURING COMPANY
A division of Textron American, Inc.
1080 State Street, New Haven 11, Conn.

This (New) Manual tells you

HOW TO HANDLE INDUSTRIAL WASTES

The proper handling and disposing of industrial waste materials of all kinds is becoming an increasingly acute problem in manufacturing processes today. To avoid excessive repair costs and prevent code violations by dumping wastes into sewers and public water courses, JOSAM, the pioneer in the waste interception field, has prepared a manual describing many effective means of handling this problem. Send coupon below today.

JOSAM MANUFACTURING COMPANY
Dept. FM • Michigan City, Indiana

Please send free copy of MANUAL "W" on Waste Interception.

Firm .....
By ..... Title .....
Address .....
City ..... Zone ..... State .....

All New ELECTRONIC AMPLICALL INTERCOMMUNICATION

NEW features
NEW flexibility
SAVES hours each day—pays for itself

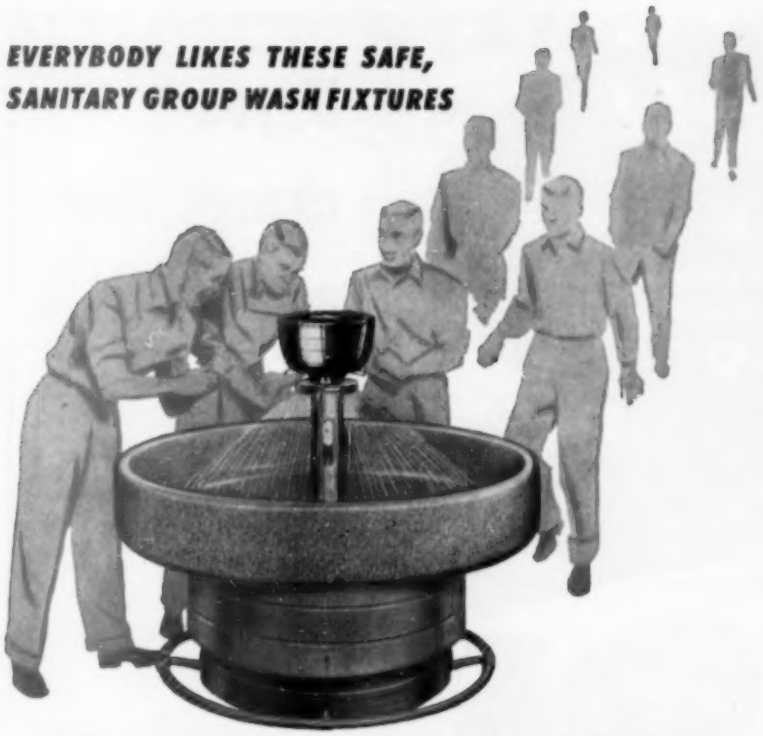
NEW!
LIGHT SIGNAL identifies caller
LIGHT SIGNAL registers caller during absence of person called
CHIME SIGNAL supplants direct-voice call-in
UNPRECEDENTED versatility to fit your exact business needs

Equip your business with this remarkable new "clear line" internal communication system. Get *2-second speech contact* within and between departments. AMPLICALL serves you best, lightens the load on busy switchboards, keeps personnel in closer working relations, cuts "walking and waiting" time—saves up to many hours per day of valuable executive time. Pays for itself in improved efficiency and speedier operations. There is a system for your exact needs. Get the New AMPLICALL facts today.

See your Classified Phone Book under "Intercommunication" for the nearest AMPLICALL Specialist, or write direct for full information . . .

RAULAND-BORG CORPORATION
3515-H Addison Street, Chicago 18, Illinois

EVERYBODY LIKES THESE SAFE, SANITARY GROUP WASH FIXTURES



ONE BRADLEY SERVES 8 TO 10

Women appreciate sanitary washing facilities, too.

Bradleys have been in wide usage for over 30 years.

Bradley Washfountains save space and reduce the number of piping connections by over 80%. Everybody likes them because of the extremely sanitary and roomy washing facilities they provide—no faucets to bother with, and no water waste since with foot-control, supply is turned "on" and "off" by means of the handy foot-rail.

Hands and arms are easily and quickly washed, while the self-flushing bowl prevents collection of used water. Janitor work and maintenance are cut to a minimum.

It will pay you to re-examine your washroom facilities—are they adequate for both men and women employees? To help you, our new colorful Catalog 5601 gives complete data and specifications . . . A copy is yours for the asking.

BRADLEY WASHFOUNTAIN CO.
2215 W. Michigan St., Milwaukee 1, Wis.

THE STANDARD FOR OVER 30 YEARS

Write today for Catalog 5601.

BRADLEY *Washfountains*

Distributed Through Plumbing Wholesalers

Our experienced washroom consultants can help you.

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Toronto 9, Ont.: Aristocrat Mfg. Co., Ltd.

Start Right

WITH THE RIGHT PUMP!

here's how to pick it from the top line of pumps for every service

"BUFFALO"

CLEAR WATER JOBS

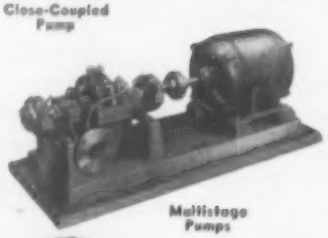
Do you plan to handle large volumes, medium pressures, for air washing, air conditioning, general water service? Your most efficient and satisfactory choice is a "Buffalo" SL Double Suction Pump. Capacities to 14,000 gpm. Write for Bulletin 955. And where *space is short*, a "Buffalo" Close-Coupled Pump will give you excellent service in capacities up to 1100 gpm. Write for Bulletin 975. However, where you're handling *real pressure—up to 1500 feet*, as in boiler feed—a "Buffalo" Multistage Pump will give you the performance you want.

Double Suction Pumps

Close-Coupled Pump

CHEMICAL LIQUIDS

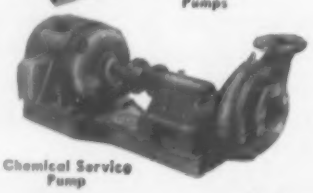
Husky "Buffalo" Single Suction Chemical Pumps are available for almost any chemical liquid a pump can handle—from acetic acid to zinc sulphate. These are built in a wide choice of trim, as well as rubber-lined for highly corrosive chemicals.



Multistage Pumps

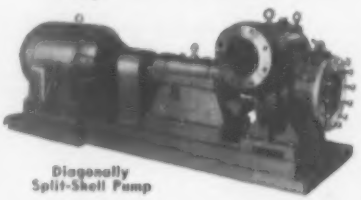
PAPER STOCKS

"Buffalo" builds efficient, long-lived pumps for every job in the mill. These range from Diagonally Split-Shell Pumps for high consistency stocks to rubber-lined models to solid shell pumps for agitation, etc. All are described in Bulletin 953.



Chemical Service Pump

IN EVERY "BUFFALO" PUMP, you get a "plus" value—the "Q" Factor—the built-in Quality that means trouble-free satisfaction and long life. 79 years of hydraulic experience back up your choice of "Buffalo" as a top pump value.



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DIVISION OF BUFFALO FORGE COMPANY

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Canada Pumps, Ltd., Kitchener, Ont.

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Also....

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STANDARD Brush Killer is highly effective against woody plants. Kills oak, hickory, elm, osage orange, brambles, poison ivy, poison oak, hawthorn and many others.

STANDARD Elm Spray destroys the insect carriers of Dutch elm disease and elm phloem necrosis. Can also be used to control many leaf eating insects and scale insect crawlers.

STANDARD Summer Emulsion Concentrate (VERDOL). Safe—effective. Gets scale crawlers, red spiders and white flies. Use alone—or with lead arsenate or nicotine.

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Concentrated killer for fly and mosquito control when sprayed on screens, around doors, and on shrubs. Mixes easily with water. Leaves a long-lasting, insect killing deposit.

STANDARD Insect Spray with DDT is especially recommended for surface spraying inside buildings. Gives long-lasting residual effect—controls insects for weeks. All mixed—ready to use.

Your Standard Oil Industrial Salesman is ready to serve you any time. Just give him a call. He'll see that you get fast delivery service from the nearest of hundreds of well-stocked warehouses all over the Midwest.

STANDARD

STANDARD OIL COMPANY
(Indiana)

C.C. MOKUM SOLVES ANOTHER

COFFEE BREAK PROBLEM

by AL CAPP

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RUDD-MELIKIAN, INC.
Hatboro, Pa.

Kwik Kafe

Gentlemen:
Please send me a copy of booklet 130 explaining how to control the coffee-break with R-M dispensers.

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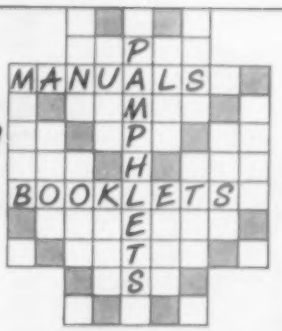
City ..... Zone ..... State .....

IF THIS IS YOUR

PROBLEM



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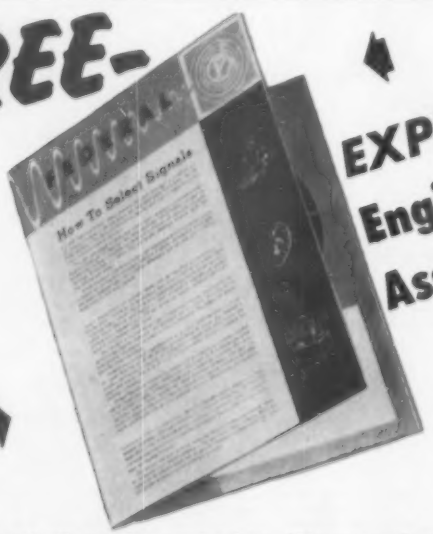

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Improve plant and office efficiency and safety through the use of proper audible and visual signals.

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Now, FEDERAL will send you *FREE* and without obligation their newest brochure entitled

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are man-hours slipping through your fingers?

P-A-X "inside" communication cuts this loss

P-A-X provides instant, person-to-person communication, anywhere within your organization.

When your people are walking about to exchange information, they're *wasting time.* What you need is a P-A-X Business Telephone System, to provide communication—in *seconds*—between all parts of your plant. The P-A-X system makes it easier to supervise and coordinate all operations, and maintain top efficiency.

Rent-free P-A-X systems are privately owned and controlled—your own maintenance men install and move P-A-X telephones as you wish. Entirely separate from the public telephone system, P-A-X gives you lightning-fast service, always—no matter how busy the city switchboard may be.

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AUTOMATIC ELECTRIC

ORIGINATORS OF THE AUTOMATIC DIAL TELEPHONE

Cancer and healthy cells seem to feed on different kinds of "food." We know how to make some cancer cells die by starving them. Will we starve out all kinds of cancer cells one day? Only more work and research will tell.

Some cancer patients develop substances that fight their own tumors. When science knows more about antibodies, we may have a new cancer treatment. Only more work and research will tell.

Some cancers are being halted by atomic materials. Can new radioactive isotopes affect other cancers in the same way? Only more work and research will tell.

New drugs are being developed that fight specific kinds of cancer. Will any of them turn out to be cancer-killers? Only more work and research will tell.

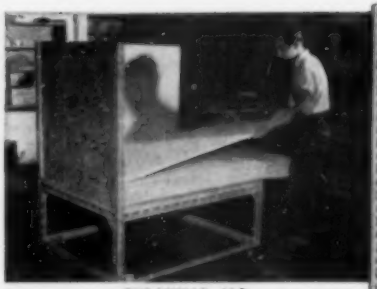
Some good news about cancer

. . . and how you can make the news better

These photographs illustrate some of the work our scientists are doing in the fight against cancer. Just one thing is needed to keep this research going. Your help. If you—and all of us—give today, the research will go on until we conquer our greatest enemy—cancer. Help fight cancer with your check. Give generously. Send your contribution to CANCER, c/o your town's Postmaster. AMERICAN CANCER SOCIETY.

You name it . . .
DEXION will frame it

DIE RACK



STACKING JIG

BAR STOCK RACK

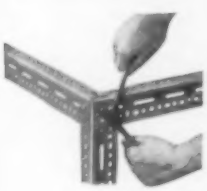
SHELVING

WORK TABLE

CONVEYOR

Easy to cut! Simple to connect! Reusable! . . . it's the perfect low-cost framing material!

DEXION Slotted Angle is easy to assemble. You can build any frame in minutes. This galvanized steel angle is strong and rigid . . . lasts indefinitely. No drilling or welding. No waste. Easily dismantled, DEXION can be reused to build any other frame. Only your imagination limits its use. DEXION is the perfect, low-cost framing material.



Simple to connect. No special parts or fittings are needed.

Easy to cut. One down-stroke of the DEXION cutter cuts square, accurate and clean.

DEXION panels. Use for shelving to support heavy loads. Heavy duty casters are also available.

DEXION Slotted Angle is a packaged product, ten pieces to a package. It's easy to store, occupies approximately one cubic foot of space. There are two sizes: 3" x 1⅛" x .104" and 2¼" x 1⅛" x .080" in ten and twelve foot lengths.

Here are a few of the many ways DEXION is being used

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- Catwalks
- Gravity Feed Storage
- Shelving
- Warehousing Racks
- Machinery Mount & Guard
- Work Bench
- Pipe Line Hangers
- Control Box Mountings
- Bulk Storage Bins
- Bar Stock Racks
- Mezzanine
- Tire Storage Racks
- Conveyor Framework
- Carts
- Vertical Sheet Storage
- Cable Rack
- Cutting Tables
- Conduit Hangers
- Platforms
- Pallet Racks

Write to Dept. 4-A today for free DEXION folder. Or write the DEXION Division, Acme Steel Company, 2840 Archer Avenue, Chicago 8, Illinois for the name of your nearest DEXION office or distributor.

DEXION SLOTTED ANGLE

ACME STEEL

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The April issue of FACTORY is published in two parts, each with separate editorial and advertising content. The advertisers in Part 2 are indexed below. For complete Index to Advertisements in both parts, see pages 203 and 204 in Part I.

Acme Steel Company
Dexion Division ... D–117
Adam Electric Co., Frank C–46, C–47
Aget Mfg. Co. ... D–76
Airtemp Division
Chrysler Corp. ... D–103
Alco Valve Co. ... D–35
Allegheny-Ludlum Steel Corp. ... B–57
Allen-Bradley Company
Insert C–44, C–45
Allis Chalmers Mfg. Co. C–24, C–27, C–28, C–29, C–30, C–33, D–93
Aluminum Company of America
B–67, D–87
American Blower Corp. D–26, D–27
American Cancer Society ... D–116
American District Telegraph Co. D–107
American-Marietta Co.
Valdura Division ... D–78
Anaconda Wire & Cable Company C–23
Ansul Chemical Co. ... D–105
Arco Company ... D–83
Armco Drainage & Metal Prods. Inc. ... B–68
Automatic Electric Co. ... D–115

Benjamin Electric Mfg. Co.
Fourth Cover, Part 2
Babcock & Wilcox Company ... D–57
Baldwin-Hill Company ... D–82
Baltimore & Ohio Railroad ... B–46
Barrett Division Allied Chemical & Dye Works Corp. B–65, D–47
Barry Controls Incorporated ... D–34
Bayley Company, William ... B–47
Bendix Aviation Corporation
Friez Instrument Div. ... D–80
Bradley Washfountain Co. ... D–111
Brulé Incinerators ... D–70
Buffalo Forge Company ... D–100, Third Cover, Part 2
Buffalo Pumps, Inc. ... D–112
Bulldog Electric Products Co. ... C–26

Carey Mfg. Co., Philip B–36, B–37
Certified Ballast Manufacturers ... C–41
Champion Lamp Works ... D–74
Chelsea Fan & Blower Co., Inc. ... D–88
Cities Service Oil Company ... D–56
Clarage Fan Company Insert D–40d
Clark Controller Company ... C–31
Corrulux Division,
L-O-F Glass Fibers Co. ... B–53
Crawford Door Company B–40, B–41

Day Company ... D–62
Day-Brite Lighting, Inc. Insert D–40a
Day-Ray Products, Inc. ... D–106
DeLaval Steam Turbine Co. ... D–71
Detrex Corporation ... D–108
Detroit Steel Products Co. B–26, B–27
DeVilbiss Company ... D–30, D–31
Diamond Wire & Cable Co. ... C–32
Dolge Co., C. B. ... D–104
Dracco Corporation ... D–73
du Pont de Nemours & Co., (Inc.) E.I.
Finishes Div. Insert D–24a
Polychemicals Dept. D–36, D–37

Ebasco Services, Inc. ... Insert B–32b
Edwards Company, Inc. D–48, D–49

Factory Management & Maintenance ... C–40, C–50
Federal Sign & Signal Corp. D–114
Feedrail Corporation ... C–44
Felters Co. ... D–28, D–29
Finnell System, Inc. ... D–23
Flexible Steel Lacing Co. ... D–91
Flintkote Co. ... B–56
Furnas Electric Company ... C–34

Gamewell Company ... D–72
Gardner-Denver Company ... D–98
General Blower Company ... D–78
General Electric Company
Apparatus Dept. C–48, C–49
Lamp Div. D–58 D–59
Trumbull Components Dept. C–43
Glidden Company ... D–67
Graybar Electric Co., Inc. ... C–45
Grinnell Company ... B–33
Grip-Strut Div., Globe Co. ... B–62

Hall Laboratories, Inc. ... D–55
Handling Devices Company, Inc. D–76

Industrial Development Committee of 100 ... B–54
Ingersoll-Rand ... D–85
Inland Steel Products Company B–58
I-T-E Circuit Breaker Co.
C–25, C–38, C–39

Jenkins Bros. ... D–51
Jenn-Air Products Co., Inc. ... B–38
Jennison-Wright Corporation ... B–39
Johns-Manville Corporation B–48b, B–66
Johnson Service Company ... D–77
Josam Manufacturing Company D–110

Keasbey & Mattison Co. ... B–39
Kellogg Switchboard & Supply Co. D–92
Kennedy Valve Mfg. Co. ... D–84
Kent Co., Inc. ... D–94
Kentile, Inc. ... B–52
Kidde & Company, Inc., Walter D–119
Kimberly Clark Corporation
Insert D–24b
Kinnear Mfg. Co. ... B–30
Klemp Metal Grating Corporation B–54
Koppers Company, Inc. ... B–32
Korfund Company, Inc. ... D–54

Lamson Corporation ... D–106
Legge Company, Inc., Walter G. D–104
Linen Supply Association ... D–68
Logan Clay Products Company D–102
Lunkenheimer Co. ... D–25

Mahon Company, R. C. ... B–35
Markal Company ... D–104
Master Builders Co.
Second Cover, Part 2
MB Manufacturing Company, Inc. D–110
Mercoid Corp. ... C–42
Micro Switch, Division of Minneapolis-Honeywell Reg. Co. C–35
Mississippi Glass Co. ... B–24
Multi-Clean Products, Inc. ... D–96
Muncie Gear Works, Inc. ... D–88

Natco Corporation ... B–23
National Coal Association ... D–45
National Electric Coil Co. ... C–42
Niagara Blower Company ... D–108
Nicholson & Company, W. H. D–120
Norgren Company, C. A. ... D–64
Norton Company ... B–31

Otis Elevator Company B–60, B–61
Owens-Corning Fiberglas Corp. ... B–63

Pangborn Corporation ... D–44
Pantex Manufacturing Corp. ... D–89
Peerless Electric Company ... D–90
Penco Metal Products Division Alan Wood Steel Company ... D–50
Pennsylvania Industrial Chemical Corp. ... B–45
Pepsi-Cola Company ... D–65
Pittsburgh Corning Corp. B–29, B–48a
Power-Strut, Inc. ... B–48
Powers Regulator Co. ... D–69
Protectoseal Company ... D–72

Quaker Rubber Division H. K. Porter Company, Inc. ... D–95

Rauland-Borg Corporation ... D–110
Raynor Manufacturing Co. ... B–44
Read Standard Corp. ... D–86
Republic Steel Corporation B–50, B–51
Resolite Corporation ... B–42
Reynolds Metals Company B–25, B–64, D–52
RLM Standards Institute ... D–101
Robertson Company, H. H. ... B–32a
Rome Cable Corporation ... C–52
Roots-Connersville Blower Div., Dresser Industries, Inc. ... D–42
Rudd-Melikian, Inc. ... D–114
Rusticide Products Company ... D–40
Rust-Oleum Corporation ... D–81

Scott Paper Company
Insert D–40b, D–40c
Snower & Company, M. ... D–68
Spang-Chalfant Division, National Supply Co. ... D–75
Speedi-Dri Corporation ... D–63
Sperti Faraday, Inc. ... D–86
Standarl Oil of Indiana ... D–113
Standard Pressed Steel Co. ... D–99
Stratoflex, Inc. ... D–68
Sturdi-Bilt Steel Products, Inc. D–88
Sugar Beet Products Co. ... D–79
Surface Combustion Corp. Janitrol Division ... D–43
Sylvania Electric Products, Inc. D–97

Taco Heaters, Inc. ... D–76
Taylor Co., Halsey W. ... D–102
Tennant Co., G. H. ... D–56
Tennessee Industrial & Agricultural Development Comm. ... B–41
Tokheim Corporation ... D–110
Trane Company ... D–38, D–39
Transwall Coated Products, Bemis Bros. Bag Co. ... B–34
Turco Products, Inc. ... D–32
Turfgrass Farm ... B–40

Up-Right Scaffolds ... D–53
U. S. Hoffman Machinery Corp. D–46
U.S. Rubber Company Mechanical Goods Division ... B–28 Naugatuck Chemical Div. ... B–40
U.S. Steel Corporation ... B–43
Uvalde Rock Asphalt Co. ... B–49

Wagner Electric Corp. C–36, C–37
Waverly Petroleum Products Co. D–56
Weatherhead Company ... D–61
Westinghouse Electric Corp. C–51
Electric Appliance Division ... D–24
Sturtevant Division ... D–60
Wheelabrator Corporation ... D–96
Wheeling Corrugating Co. ... E–55
Wiegand Company, Edwin L. ... D–41
Worthington Corporation D–33, D–109

FIRE!

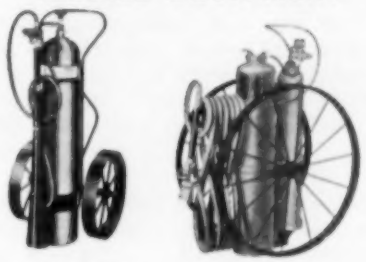
HOW TO DETECT AND EXTINGUISH IT IN SECONDS!

HAND PORTABLES

Carbon Dioxide | Foam Soda-Acid Clear Water Anti-Freeze | Pressurized Water Anti-Freeze | Dry Chemical

Kidde CO_2 Portables, either trigger-release type or squeeze-type valve models, are available in sizes from 2½ to 20-pound capacities. New Kidde Wet Chemical extinguishers are available in 2½ gallon bronze or stainless steel models, including pressurized Water or Water-Anti-Freeze Unit (illustrated). Kidde Dry Chemical Extinguishers are available in cartridge-operated models of 20 and 30 pounds capacity or pressurized models of 5 and 10 pounds capacity.

MOBILE EQUIPMENT

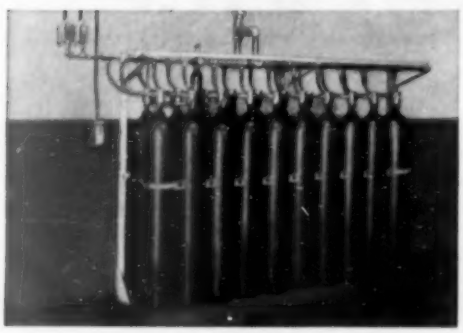


50, 75 and 100 lb. CO_2 Units | 150 lb. Dry Chemical Unit

For major fire hazards, get a mobile unit. Wheeled CO_2 units are available in 50, 75 and 100 pound capacities, in one cylinder.

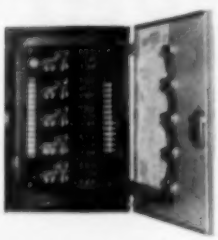
150 pound dry-chemical unit has straight stream for long range . . . fan pattern for wide coverage. Both units give expert results even with inexperienced operator.

CO_2 SYSTEMS



New Kidde pressure-operated CO_2 extinguishing systems are individually designed to fully protect even the most dangerous hazards, use no falling weights or clumsy mechanical triggering methods. Pneumatic Control Heads insure instant and complete CO_2 discharge. Directional Valves afford protection to more than one hazard using the same bank of CO_2 cylinders.

ATMO DETECTING SYSTEMS



Kidde ATMO is a wide-area automatic fire detecting and warning system which works on the principle of rate-of-temperature-rise. It is ideally suited for cases where life protection is of vital importance, or where quick, early detection of fire in valuable materials is essential.

The very first hot breath of fire triggers the carbon dioxide system, and sounds the alarm. In addition, the system can also close doors, shut off fans or blowers – all *automatically*.

What's more, the Kidde ATMO system operates independently of regular power sources, will still give protection even if outside power fails.

Kidde

Walter Kidde & Company, Inc., 432 Main Street, Belleville 9, N. J.
Walter Kidde & Company of Canada, Ltd., Montreal–Toronto

Nicholson *steam trap* quality *gives you* . . .

extra stamina for severest service

Write, today, for your copy of new Bulletin 10-55—for detailed information.

Nicholson quality . . . throughout . . . means the extra strength, extra capacity, extra stamina that never let down. And, Nicholson quality pays off, when it comes to discharging condensate and air from plant steam lines and equipment . . . most efficiently, dependably, economically.

- **powerful valve action—big husky bellows.**
- **positive shut-off—finely ground valve and seat.**
- **high capacity—effective use of large orifice.**
- **each unit service tested—with steam.**

When less than the best won't do, specify Nicholson.

NICHOLSON

W. H. NICHOLSON and Company

TRAPS • VALVES • FLOATS • METAL PARTITIONS
LAUNDRY, DRY CLEANING AND PRESSING MACHINERY

14 OREGON STREET, WILKES-BARRE, PA. • SALES AND ENGINEERING OFFICES IN 98 PRINCIPAL CITIES

Here's A HANDY POSTCARD THAT WILL HELP YOU —

GET MORE INFORMATION

How to use this Reader Service Card...

The bottom of this page is a postcard—you'll note that the page has been perforated so you can tear it out easily. This postcard makes it easy for you to get more information on anything that's advertised in FACTORY, or listed in FACTORY's Catalog News Section, or in FACTORY's Equipment Review Section.

Catalog News Section (in three parts): Starts on pages B-30, C-32, and D-31. FACTORY's Editors look at scores of catalogs each month, and select those that will be most helpful to you. In the Catalog News Section of the postcard, circle the numbers corresponding to the numbers of the catalogs you want. You'll get them—without obligation—direct from the manufacturer.

Equipment Review: Starts on page D-80. Here FACTORY's Editors have selected new equipment items from all the past year's issues to help you solve your future planning problems. Here, too, each item is identified by a number. In the Equipment Review Section of the postcard, circle the numbers of the items you'd like to know more about. You'll get information direct from the manufacturer, without obligation.

Advertising Section: The postcard has numbers corresponding to the page numbers of the advertisements. Circle the page numbers of those you're interested in. Where more than one advertisement is on a page, the letters L, R, T, B indicate location: left, right, top, bottom.

Then be sure: Fill out your name, address, and other information in the space provided, tear out the card, drop it in the mail. The data requested will be forwarded to you shortly.

Note: This issue is in two parts. There is a Reader Service Card in both. Be sure to use this card for items in PART 2 only.

(Use this card only for items in Part 2)

APRIL 1956 — Part 2

(Good until June 30, 1956)

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. . . items in the CATALOG NEWS SECTION as circled below:

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44
45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66
67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88
89	90	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110
111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130	131	132
133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152	153	154
155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176
177	178	179	180	181	182	183	184	185	186												

. . . items in the EQUIPMENT REVIEW SECTION as circled below:

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44
45	46	47	48	49	50	51															

. . . items ADVERTISED on the pages circled below:

B-23	B-24	B-25	B-27	B-28	B-29	B-30	B-31	B-32	B-32a	B-32b	B-33	B-34	B-35	B-37	B-38
B-39	B-40L	B-40R	B-41R	B-41B	B-42	B-43	B-44	B-45	B-46	B-47	B-48	B-48a	B-48b	B-49	B-52
B-53	B-54T	B-54B	B-55	B-56	B-57	B-58	B-59	B-61	B-62	B-63	B-64	B-65	B-66	B-67	B-68
C-23	C-24	C-25	C-26	C-27	C-29	C-30	C-31	C-32	C-33	C-34	C-35	C-37	C-39	C-41	C-42L
C-42R	C-43	C-44	C-44a	C-45	C-47	C-49	C-51	C-52	D-23	D-24	D-24a	D-24b	D-25	D-27	D-29
D-30	D-32	D-33	D-34	D-35	D-37	D-39	D-40	D-40a	D-40b	D-40d	D-41	D-42	D-43	D-44	D-45
D-46	D-47	D-49	D-50	D-51	D-52	D-53	D-54	D-55	D-56L	D-56R	D-57	D-59	D-60	D-61	D-62
D-63	D-64	D-65	D-66	D-67	D-68L	D-68R	D-69	D-70	D-72L	D-72R	D-73	D-74	D-75	D-76L	D-76T
D-78B	D-77	D-78L	D-78R	D-79	D-80	D-81	D-82	D-83	D-84	D-85	D-86L	D-86R	D-87	D-88L	D-88T
D-88R	D-89	D-90	D-91	D-92	D-93	D-94	D-95	D-95L	D-95R	D-97	D-98	D-99	D-100	D-101	D-102T
D-102B	D-103	D-104L	D-104T	D-104B	D-105	D-106L	D-106R	D-107	D-108L	D-108R	D-109	D-110TL	D-110TR	D-110BL	D-110BR
D-111	D-112	D-113	D-114L	D-114B	D-115	D-117	D-119	D-120	Second Cover		Third Cover		Fourth Cover		

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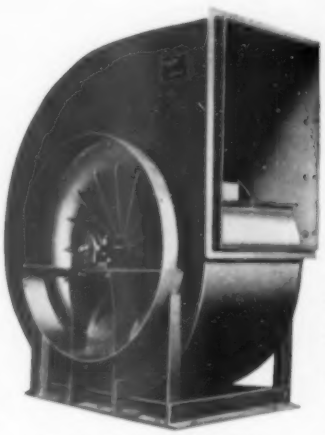

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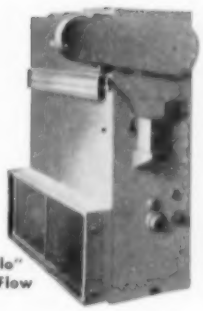

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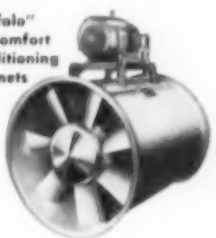

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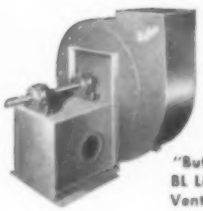

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